TECHNOLOGY REVIEW

January 1949

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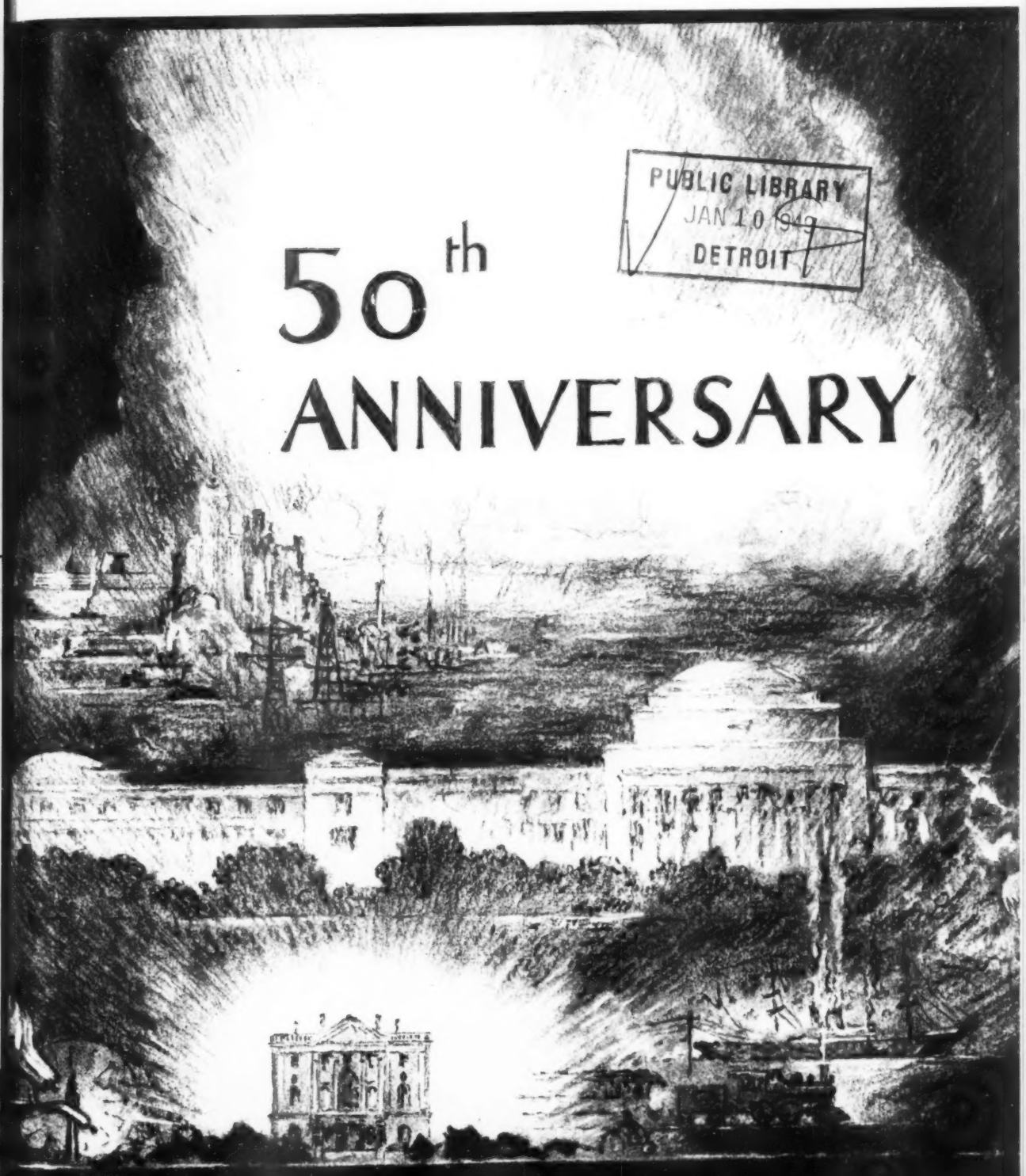
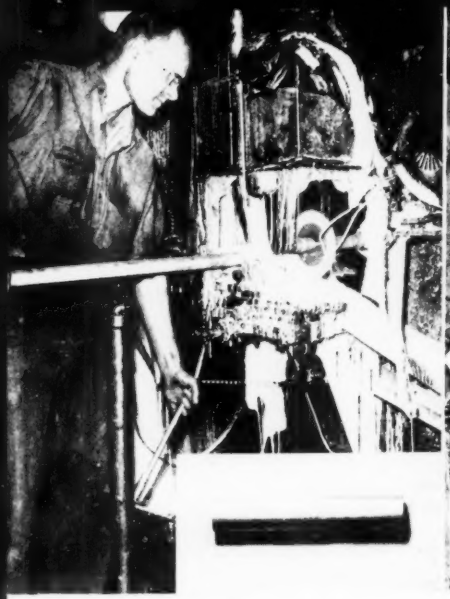
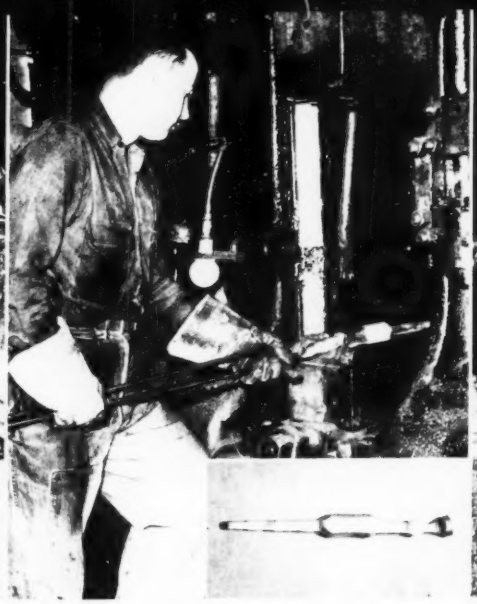
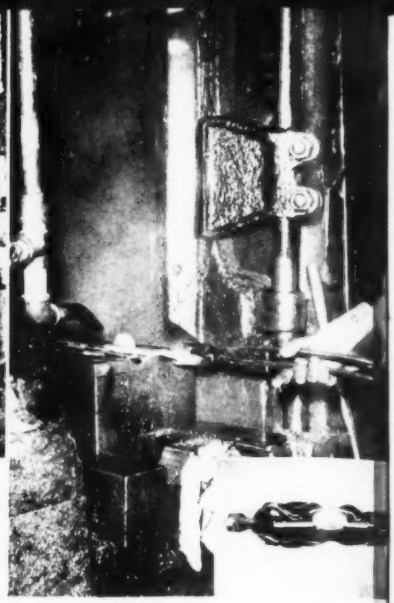




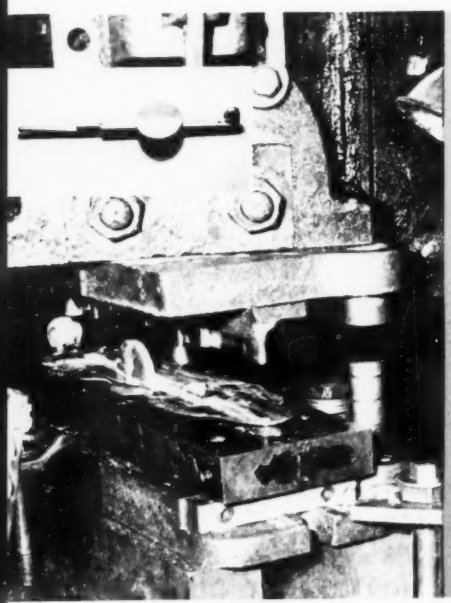
Cutting Bar



Lengthening and Shaping



Shaping to the Die



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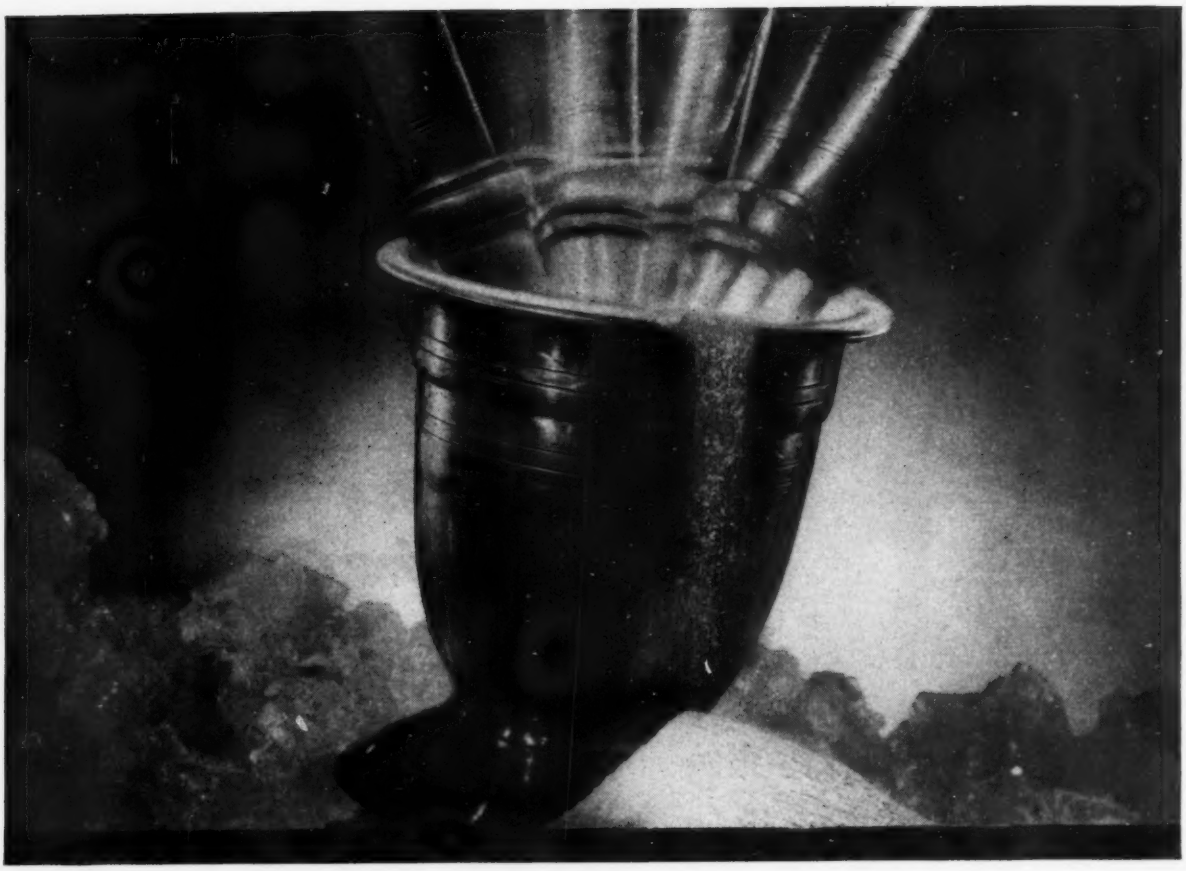

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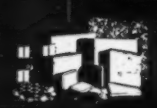
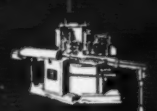

NON-SLIP FLOORS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Large ethylene plants are much like big petroleum refining units.

An ethylene plant must be designed for high yields, varying charge stock compositions, economical operation and minimum investment costs. Fundamental design must take a long term view of the plant—ease of operation, long on-stream periods, minimum turnaround time and low maintenance costs.

Long range thinking, good engineering, careful planning by Jefferson Chemical Company and Lummus are reflected in the performance of this ethylene plant at Port Neches. This plant is producing high yields of ethylene from varying charge stock compositions. When shut down for scheduled inspection after five months initial run, turnaround was completed in about fourteen days. Examination showed equipment to be unusually clean and in good mechanical condition.

Playing an important part in the high yields of this ethylene plant are the Lummus Cracking Heaters, especially designed to obtain required temperature-time relationship with minimum coke deposition. On-stream periods of two months have been obtained and there are good possibilities of extending these periods.

Including an ethylene plant now under construction, Lummus has designed four plants for the production of ethylene from petroleum, with a total capacity of approximately half million pounds per day.

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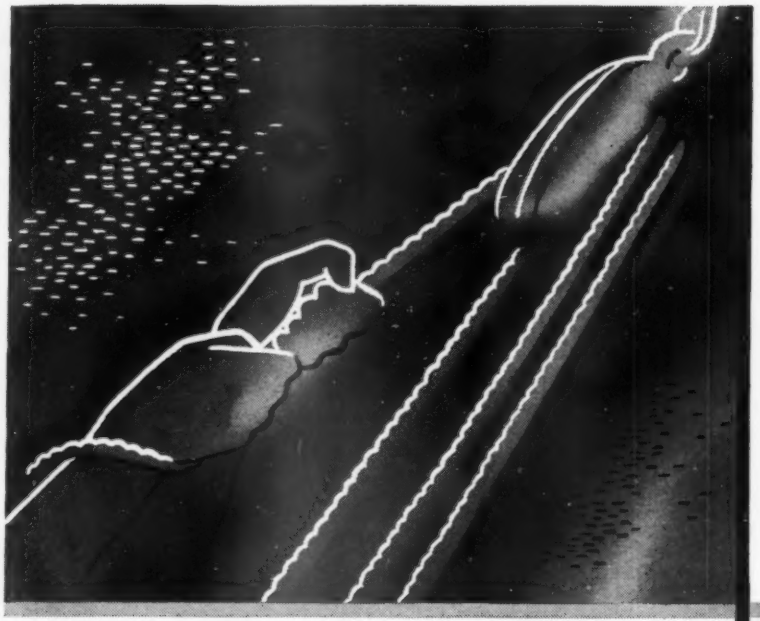
THE TABULAR VIEW

Editor-Publisher. — Successively student of architecture, infantry officer in World War I, assistant director of the Division of Industrial Coöperation, assistant dean of students, editor of The Review, dean of students, publisher of The Review, chairman of the Technology Loan Fund, and executive vice-president of the Alumni Association — all at the Institute, with the obvious exception of war service — H. E. LOBDELL, '17, has been associated with The Review for half of its five-decade existence. Mr. Lobdell records (page 155) the significant events in The Review's struggle to provide a chronicle of events relating to M.I.T., its Alumni, and matters of scientific and technical interest.

Editor-Poet. — This month, The Review breaks its practice of hewing strictly to prose, and presents (page 161) a piece on geology and engineering construction in the language of a poet by former Review editor F. G. FASSETT, JR. Upon acquiring a youthful taste for printer's ink in the Waterville (Maine) *Sentinel*, which his father edited, Mr. Fassett studied at Colby College and took graduate work at the University of Maine and at Harvard University. He was also reporter, correspondent, and editor of Maine newspapers before becoming a professor of English at M.I.T. In 1945, Professor Fassett became director of the Office of Publications and Public Relations of the Carnegie Institution of Washington.

Editor-President. — Third of The Review's former editors to be represented in this issue is JAMES R. KILLIAN, JR., '26. Bespeaking the independence for which New England has been so well known, President Killian, whose honors include the degree of doctor of engineering from Drexel Institute conferred on December 14, presents a stout case (page 162) for strongly financed, privately endowed institutions of learning. Dr. Killian's administration of Institute affairs is widely known. In this column, we emphasize his earlier work as writer on topics in science and engineering, teacher of journalism, editor of The Review, past national vice-president of the honorary journalistic fraternity, Pi Delta Epsilon, past chairman of the Board of Publication for The Technology Press, and (with Harold E. Edgerton, '27) coauthor of *Flash!* — a beautifully executed volume on the technique of modern high-speed photography.

Editor-Professor. — Not only because he is author of many scientific papers and two volumes on science (*Atoms in Action* and *How Things Work*) does GEORGE R. HARRISON, Dean of Science, qualify under the boldface paragraph headings of this page. He also qualifies as valued contributor to The Review, and if not one of its former editors, Dean Harrison is editor of the *Journal of the Optical Society of America*. Prior to becoming dean of science in 1942, he was professor of physics. In his sprightly pronouncements (page 165) Dean Harrison views the Institute, and some of its administrative leaders, with kindly whimsey.



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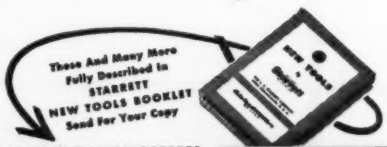

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MAIL RETURNS

Bread upon the Waters

[*Letters such as the following from the president of the Republic of Italy, addressed to Dr. Compton, continue to indicate the worthwhile value of undergraduate ideas as expressed by the Foreign Student Summer Project which was effected last summer.* — Ed.]

FROM LUIGI EINAUDI:

It was very kind of you to send me, through the courtesy of Gian Federico Micheletti, your message of September 20, 1948.

I was deeply interested in hearing, from the description contained in your letter and from the additional explanatory details given to me by Mr. Micheletti, of all the activity carried out by M.I.T. in the field of the exchange of ideas between students of different countries, and particularly as far as the group of the Italian postgraduate students is concerned.

Not only as a former professor in the Polytechnical Institute of Turin, but also as a constant and sincere promoter of any initiative aiming to the strengthening of international understanding in cultural and scientific fields, I wish to express to you my personal appreciation for the advantageous work done by the Institute of Technology with such high purpose. I consider it a real privilege that the Italian students were the guests of your institution during the past summer.

My best wishes for the increasing success of your iniatives and for your personal prosperity.

Rome, Italy

Timing

FROM DONALD R. STEVENS, '11:

May I compliment Ward Allan Howe not only for his excellent photograph on page 94 of the December, 1948, Review, but also for his choice of "The Invader" as the title.

I wonder whether he took the picture first and then thought of the title, or whether he thought of the title and then waited for the proper timing of train, sky, and tranquility. Rarely have I seen a photograph so beautiful, fully equaled by a title so inspiring.

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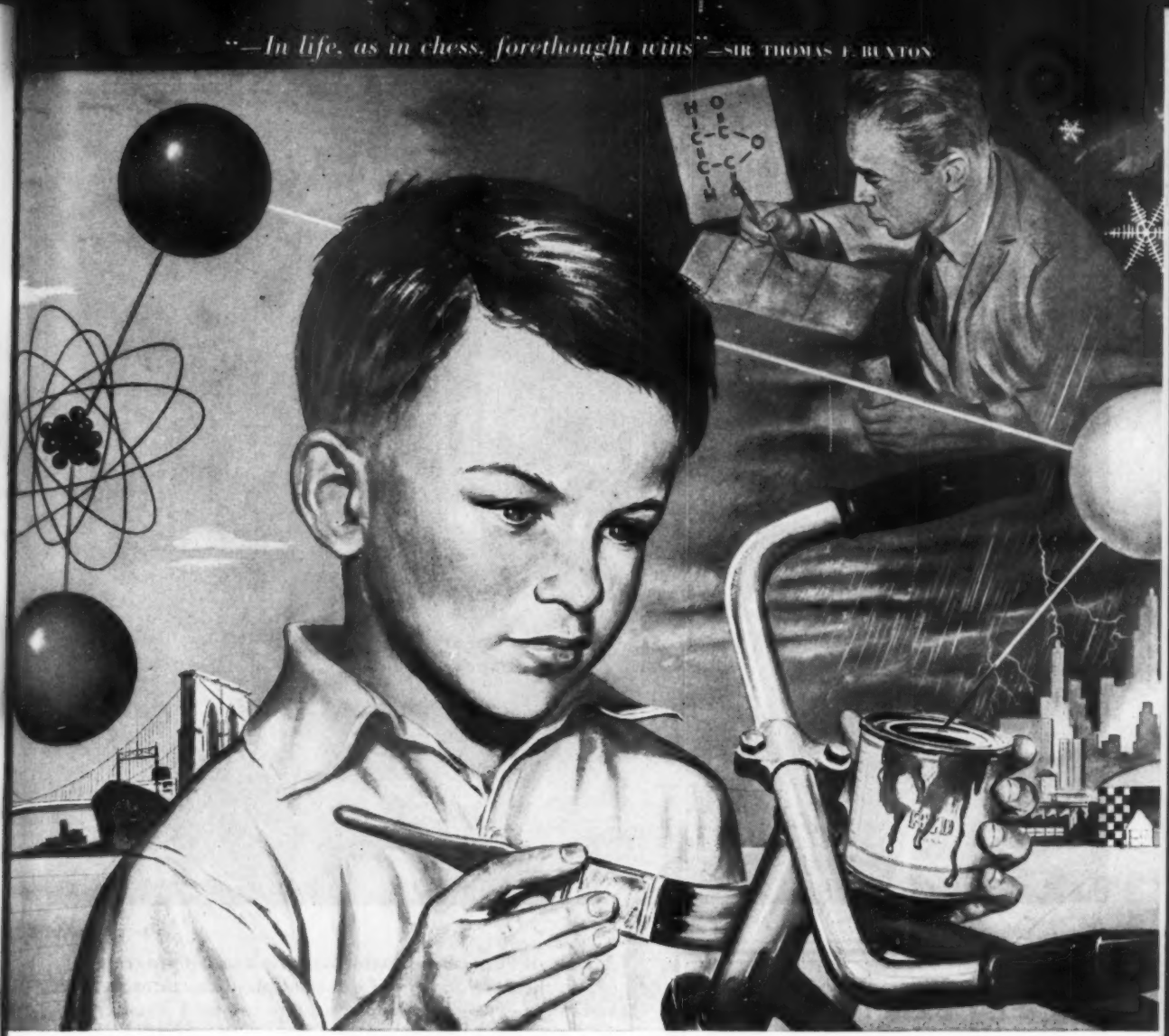
"—In life, as in chess, forethought wins" —SIR THOMAS F. BUXTON



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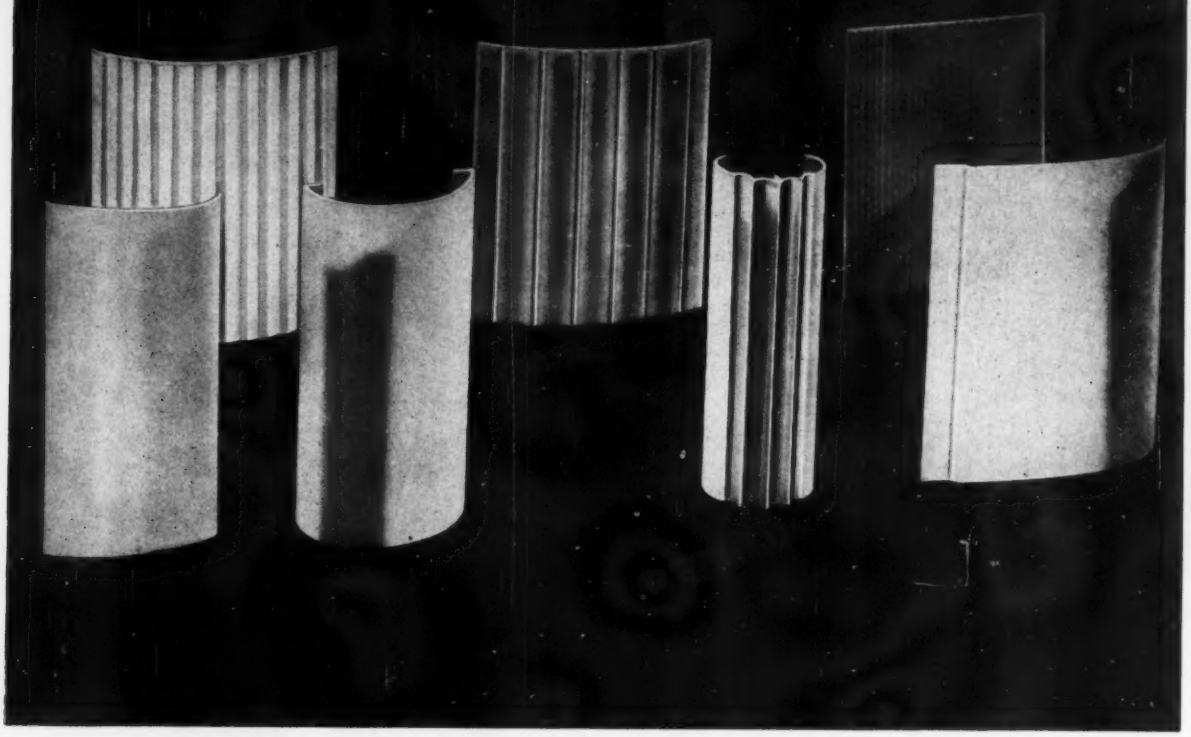

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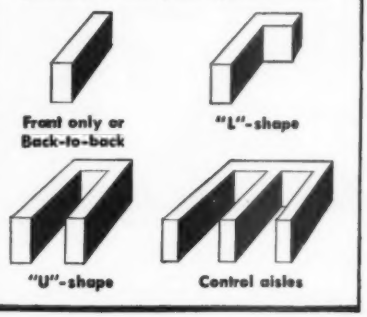

Putting skilled operating men in several places at once is a practical step toward producing *faster*, *better*, *cheaper*. That's why more and more plants are installing modern Westinghouse Control Centers.

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THE TECHNOLOGY REVIEW

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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The Review's eighth editor looks at the science of geology with the eyes of a poet

FUNDING M.I.T.'S INDEPENDENCE ..... BY JAMES R. KILLIAN, JR. 162
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The Evolving Page

Shown below, at approximately half size, are reproductions of those pages which ushered in a new decade of Review publishing. The three reproductions at the top of the page are from volumes issued quarterly. When the enlarged Review made its appearance on a monthly basis, issues were numbered with the beginning of the school year, rather than on a calendar year basis.

The Technology Review

Vol. I. JANUARY, 1899 No. 1

ANNOUNCEMENT

To a community groaning under an ever increasing weight of periodical literature, a new magazine is forced to present itself in an attitude of apology. Like those college men with whom its interests are to be most closely bound, The Technology Review must make plain its purposes, its capacity, its determination to be useful, before it can expect to receive recognition from a public too busy to be indulgent. Realizing this, and mindful, too, of the spirit and traditions of the Massachusetts Institute of Technology, The Review neither throws itself upon the charity of its friends nor prays them to be blind to its shortcomings. Doubtless it will need indulgence, doubtless its attainment will fall much below its aspiration; but if it does not so far succeed in its attempt as to gain support through feelings other than those of simple friendliness, the existence of The Review cannot be too quickly ended.

Few appreciate how vast and complicated the interests of the Massachusetts Institute of Technology have become. With students, past and present, in every State, and in almost every part of the world, occupied in all manner of work and every civic duty; with studies of great range and courses of wide divergence; with always new and ever more complex problems of education crying for solution, the Institute obviously stands in need of a clearing-house of information and thought, to increase its power, to minimize

The Technology Review

Vol. XI. JANUARY, 1909 No. 1

GREETING FROM THE PRESIDENT-ELECT

To the Alumni of the Institute:—

Gentlemen,—I have been so much touched by the cordial greetings that you have sent to me from various parts of the Union, that I take the first opportunity of assuring you collectively that I prize your good-will very highly, and shall strive to retain it. I know enough of the history of the Institute to realize, in a measure, how much it owes to the support of its alumni and I am pleased with the prospect that there will be no diminution of that support in the future.

I come to the Institute because of my profound conviction of the importance of sound technological training and of the splendid field for service that is thus opened to me. It has so often been my lot to urge the claims of technological education before an apathetic audience that it is a peculiar pleasure to address a body of men that needs no urging in the matter. You have all realized that, in the field of industry, rule-of-thumb has been unhorsed and science placed firmly in the saddle. You know, too, that, in the fierce struggle of today between individuals and nations, that man and that race is doomed that lacks the accurate knowledge which science fosters and the power which such knowledge gives to a mind that is alert.

Knowledge and power have doubtless been watchwords at the Institute throughout its history. I trust that they will ever remain so, and that whoever presides over its destinies will see that no effort is spared to make it respected as a place of sound learning and accurate knowledge, and that this knowledge is imparted under such conditions as

The Technology Review

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Ramone S. Bacon, Editor, Massachusetts Institute of Technology, Cambridge, Mass.

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ANNUAL ALUMNI DINNER SET FOR MARCH FIRST

It is to be hoped that the annual dinner of the Institute's alumni, set this year for Saturday, March 1, will be unusually well attended. It will be not only the first and best opportunity Technology men have had to talk over our work in the war, to find out what the other fellow and the other chaps have been doing, but it will give an opportunity for all present to inspect the Walker Memorial as it is going to be in the future, cleared of military activity, the clubhouse of students and their activities and of the Faculty.

It is hoped that as many classes as possible will set their reunions for that date and will get together to inspect the Memorial in the afternoon before the dinner, which will be at seven o'clock in the Great Hall.

The speakers will be notable. Besides President Maclaurin, who will review alumni activities for the year and act as toastmaster, the program will include Governor Coolidge of the Commonwealth of Massachusetts, President Mackenzie and Vice President Lenaugh, '98, who will reminisce about his experiences in Europe. Also, Walter Gordon Merritt of New York, expert attorney on labor legislation, will tell what we have to expect from labor conditions in the future.

The dinner will be inexpensive, to meet peace-time conservation conditions, and it is hoped that we shall have a record celebration.

The Alumni Council.

IN MEMORIAM

In view of the fact that there are at present over eighty names on the Institute's roll of honored dead, the publication of whose memoirs and photographs would overflow the Review for a long time to come, we have tentatively discontinued that feature, which began only last year, in the hope that arrangements can be made to publish brief notices and pictures of the entire list, in one pamphlet to be published either as a supplement to the Review or as an independent volume, possibly by Commencement next June. That would be the most fitting time, and we feel sure the alumni would be interested in such a volume.

The Editor.

The TECHNOLOGY REVIEW

Volume 31 • January, 1929 • Number 3

EVOLUTION EVERYWHERE

A paleontologist views it as constant change

By Hervey W. Shimer

CONTINUAL change is the essential characteristic of life. It is obvious that the individual animals and plants that we see today are in some slight way different from what they were yesterday and what they will be tomorrow. In a similar way the vision of the paleontologist, which covers vast eras of the past history of the earth, notes that a gradual change has taken place in the larger units of life, the groups of organism that constitute species and genera. Through the long periods of time wherein we may trace back the record of life, there may be discerned constant change of living forms into subsequent forms, each differing but slightly from its immediate predecessor. This is evolution, the change of one form into a different form under a sequence of cause and effect.

Soil is being constantly changed from solid rock through a complicated series of chemical and mechanical reactions; that is, soil is being constantly evolved. Under the increasing competition of modern times, a detailed knowledge of these evolutionary changes is becoming more and more essential to successful work in agriculture.

In my garden is planted the Cortland apple, formed in the New York Agricultural Station at Geneva in 1898 by hand fertilizing flower buds of the Ben Davis with pollen from McIntosh blossoms. The result was a combination of the hardiness of the former and the flavor of the latter.

Hervey W. Shimer, Professor of Paleontology at the Institute. This accompanying article is the substance of a chapter in an impending book by him, treating some new aspects of the theory of evolution

Here, too, grow the Concord grapes developed by Ephraim Bull from the wild Fox grape, probably through natural crossing with the Catawba, in 1849; the cabbage, brussels sprouts and cauliflower, all produced by selection from natural changes in the wild cabbage growing on the sea cliffs of the shores of Europe, and the maize, potato and tomato developed through selection by the Mayas and Incas from wild American stock.

What is true of these garden products is also true of nearly all other food plants cultivated by man. Man has either consciously united different forms, or, more usually, has selected from natural changes the forms most suited to his needs, but in all cases the result was a change into a different form under a sequence of cause and effect. When Luther Burbank wished to produce a spineless cactus he selected the least spiny plants of successive generations until he had a spineless one. The ancient Mayas of Central America by a similar process of selection produced the large edible tubers of the potato, the enlarged cocoa of the cassava, the large grains and ears of maize.

What is true of plants is true likewise of animals. Man has gradually been changing his domestic animals into forms better suited to his desires, from the earliest records to the present. The American-bred Boston terrier is the result of a cross between the English bull dog and the English terrier and the later

THE TECHNOLOGY REVIEW

Vol. 41, No. 3 January, 1939

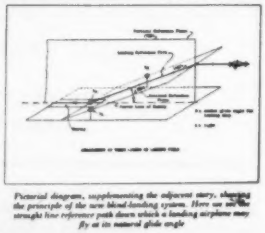
The Trend of Affairs

Trails in Space

THE power of cooperative investigation which is realistic enough to exhaust the possibilities of available existing materials before undertaking to construct new ones has been well illustrated at the Institute during the past year. The development of a blind-landing device for airplanes which bids fair to overcome one of the greatest hazards of aviation is the illustration. Previous systems utilizing "beam flying" have been only partially successful; a scheme which will give a fog-blinded pilot information about the position of his ship with respect to both its own horizontality and its relation to the landing field can be expected to come nearer complete satisfaction. And if the information can be got to the pilot in a form readily interpretable in geometric terms, so much the better.

If on a clear night an airplane nears a landing field, the pilot can be guided to a safe landing by means of three sources of light — one centered at ground level near the end of the field where the ship is to make contact, the others elevated aboveground opposite each other at each side of the field and some distance in front of the first light. The three thus sighted from above define a plane; if the pilot comes in on an imaginary line bisecting the plane, all will be well. This imaginary line is in fact a landing reference path. So reasoned Irving Metcalf of the Bureau of Air Commerce. Flying tests demonstrated the truth of his reasoning. Then developed the problem of getting the aid from such a light system reproduced in an airplane coming to land not on a clear night but in the midst of fog. An indirect application of the basic idea was needed.

For this, the Bureau of Air Commerce had recourse to M.I.T. The problem posed to a group headed by Professor Edward L. Bowles, '22, of the Department of Electrical Engineering was essentially this: to produce in a fog-blinded plane in flight the illusion of the three lights, and to produce this illusion in such a way as to make clear the attitude of the plane and the direction of approach toward the field. Professor William M. Hall, '28, suggested that the gyroscope equipment of the plane itself could be put to work in the solution, for this already gives information as to bank and climb, the aerial equivalents of the roll and pitch of a ship at sea. By the use of electrical circuits hooked to the gyro elements, involving the use of very delicate brushes only about three-thousandths of an inch in thickness, the gyroscopes were made to produce three spots of light on the screen of a cathode-ray oscillograph, thus creating the illusion in the plane of the unseen three lights on the field. Professor Charles S. Draper, '38, of the Course in Aeronautical Engineering brought his expertness with aerial instruments to bear on this phase of the problem.



Pictorial diagram, supplementing the adjacent story, showing the principle of the new blind-landing system. Here an airline straight line reference path down which a landing airplane may fly at its natural glide angle

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REVIEW

Vol. 51, No. 3 January, 1949

The Trend of Affairs

Of Yesteryear

THE Review neither throws itself upon the charity of its friends nor prays them to be blind to its shortcomings. Doubtless it will need indulgence, doubtless its attainment will fall much below its aspiration; but if it does not so far succeed in its attempt as to gain support through feelings other than those of simple friendliness, the existence of The Review cannot be too quickly ended." Thus, in January, 1899, did The Review's first editor present the new journal "to a community groaning under an ever increasing weight of periodical literature." That The Review has been able to continue uninterrupted publication throughout the past five decades – that it is this month celebrating the golden anniversary of its first issue – is due, in no small measure, to the loyal support and indulgence which its readers have accorded it, and which have aided materially in developing this journal to its present status.

With some 12,000 subscribers, a sound financial structure, and half a century of past performance upon which to draw in building for the future, The Review can regard with satisfaction its past in which there have been chronicled matters relating to M.I.T. and other events of interest in the field of technology. Like any mortal, The Review progressed through the normal stages of living: It suffered the growing pains of childhood, the uncertainty and awkwardness of adolescence, and now appears to be settling down to a mature existence, meeting current exigencies as best it can. Some of the changes through which The Review has progressed are recorded in the lead article (page 155) by H. E. Lobdell, '17, whose close association with "that valued sheet" covers half its lifetime. Other changes are reflected in the frontispiece on the opposite page which images the first pages of those volumes published in years ending in the figure 9. Much as the tintypes, taken at periodic intervals and carefully preserved in the plush family album, record the progress of family life, so does this reproduction of five intervals in The Review's history show, by subject matter and typography, the changes in its own mute way.

It comes about, then, that the review of anniversaries, which has featured the opening of January issues in recent years, takes on added significance this month, for The Review itself is justified in marching through our annual survey this January, 1949. But let us begin our annual review with the chronologically more distant events which occurred in years ending with 9.

Three hundred and fifty years ago, as Europe was embarking upon the opening of the era of science, Sir William Gilbert had concluded some 30 years of experimentation and was putting the finishing touches to his great volume *De magnete*. . . . The publication of this historic volume upset many erroneous notions which had been built up about the properties of magnets, and ushered in a new era in which philosophical speculation was to give way to experimental verification of conjectures and hypotheses in examining the world in which we live.

Two hundred years ago Pierre Simon Laplace was born in Normandy on March 28, and was destined to make important contributions in the field of celestial mechanics, some of which were subsequently applied to the burgeoning science of electricity. During 1749, in this country, Benjamin Franklin made two signal contributions to the science and engineering of electricity. As a result of his studies of atmospheric electricity, Franklin devised the lightning rod to protect buildings against lightning strokes. Important as was this contribution of applied science, perhaps an even greater one was made, in what we would now call theoretical physics, when Franklin proposed his single-fluid theory of electricity. The basic concepts which Franklin established were much more logical and simple than those required by the two-fluid theory which, in Franklin's time, had the predominant num-

ber of supporters. At the time, there was no way of proving, or disproving, either of the rival hypotheses, but history has vindicated the work of the versatile American statesman-philosopher whose single-fluid hypothesis has much in common with our present electronic concepts of electricity.

Several significant events in science and engineering occurred 150 years ago. The year 1799 marks the birth of Joseph Henry, Princeton Professor of Physics, who discovered self-induced electric currents and subsequently became the first secretary of the Smithsonian Institution. Count Rumford, whose home was in Woburn, Mass., for many years, aided the mechanistic science of his day by devising a means for eliminating or compensating for errors due to temperature and inequalities in the arms of a weighing balance, thus making a substantial contribution in the technique of determining mass. In Italy, Alessandro Volta invented the first primary cell or Voltaic pile, and definitely proved that the electric current produced by his pile was the result of chemical action and not a biological effect, as his compatriot, Luigi Galvani, had supposed. Volta's pile opened up the possibility of dealing with a steady flow of electric current instead of the temporary or transient flow which was the only possibility so long as electrostatics was the only field of electricity known.

The first half of the Nineteenth Century brought to light a wide variety of events significant to science and engineering. Charles Darwin and Abraham Lincoln were both born in 1809. In Denmark, during the winter of 1819 Hans Christian Oersted found that a continuous electric current produced a steady magnetic field. In this discovery, the long-suspected correlation between electricity and magnetism was first proved. In the same year Sir John Herschel in England discovered that sodium thiosulphate or "hypo" would dissolve silver halides or salts, and this discovery was to be of vast importance a few decades later with the beginnings of photography, since it made possible retention of a permanent photographic image after exposure. In this country, William A. Burt was granted a patent on the first typewriter on July 23, 1829, but several years were to pass before this important aid to business was to become a practical affair.

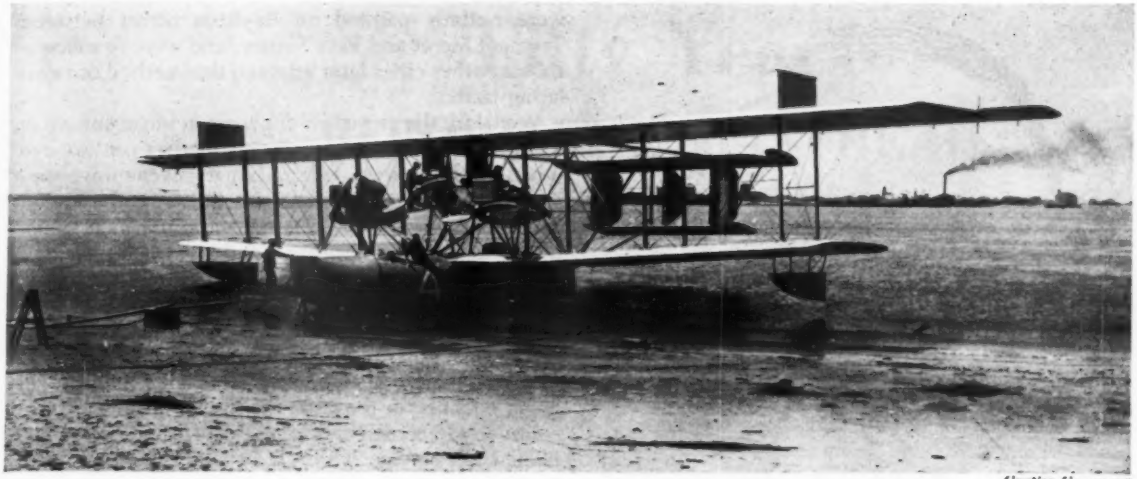
Rubber was first vulcanized by Charles Goodyear in 1839; this discovery made possible waterproof boots and raincoats, and laid the foundations for the automobile tire industry of the Twentieth Century. The year 1839 also saw the invention of an important alloy for bearings, to which the 40-year old Isaac Babbitt gave his name while in the employ of the South Boston Iron Company. Important developments during 1839 occurred in the field of photography. In this year, J. Nicéphore Niepce and Louis Daguerre of France described their invention of the daguerreotype photographic process before the Academy of Sciences. In England, Fox Talbot made the first photographic prints from paper negatives, and early in 1839 disclosed his technique of making calotypes in which the photographic image was made permanent through a process of fixation.

With the coming year we may celebrate the centennial of the California gold rush whose inauspicious beginning really occurred in December, 1848, when a few gold nuggets were picked up from the tailrace of a mill owned by John A. Sutter. Sutter attempted to keep this find secret, but his efforts were not successful and 80,000 men reached the Coast in 1849. Although, in itself, this discovery has little direct technological interest, it did much to open the West for settlement, and thereby indirectly stimulated certain technological advances, particularly in agriculture, transportation, and communication. In this country, George H. Corliss invented the stationary steam engine bearing his name, thereby making a significant achievement of mechanical engineering during the last century. And, just a century ago, Gustav Robert Kirchhoff identified the "electroscopic force" of G. S. Ohm with the electrostatic potential of George Green, thereby establishing an important link in relating current and static electricity with its electrostatic counterpart.

During the last half of the Nineteenth Century, Charles Darwin's *Origin of the Species*, which appeared in 1859, caused much discussion and some consternation to not a few traditional beliefs of 90 years ago. In the same year, G. R. Kirchhoff and Robert W. von Bunsen, both of whom were professors of physics at the University of Heidelberg, began their brilliant series of investigations of the lines of the visible spectrum, which may be said to have founded the science of spectroscopy. Their work pioneered a sensitive means of identifying chemical elements, but these Nineteenth-Century physicists could hardly have guessed that their work would lay the foundation upon which Twentieth-Century physicists would build in examining the innermost structure of the atom. Also in 1859, the first oil well in America was drilled at Titusville, Pa., and about 2,000 barrels of petroleum were produced.

George Westinghouse received the patent for his air brake for railroad cars in 1869, and the first steel-arch bridge across the Mississippi River was begun at St. Louis by James Buchanan Eads in the same year. A decade hence, electric illumination came to the fore; Thomas Edison made the first practical incandescent electric lamp in 1879. In the same year the first photograph (made with the newly produced incandescent lamp as the source of light) was exposed at his Menlo Park Laboratory. In Newark, electric arc lights were installed for street lighting by Charles Brush in the same year. By the time another decade had come about, the Eiffel Tower in France was completed, and the Singer Manufacturing Company had built the first electrically operated sewing machine. Also in 1889, Henry Augustus Rowland, Professor of Physics at Johns Hopkins University, experimentally proved that a displacement current behaved the same as a conduction current of electricity so far as the magnetic effect it produced.

So much for our survey prior to the appearance of the first issue of The Technology Review; the rest deals with those events which this journal may regard as contemporary. We pass over the coming into being of The Review, which is chronicled elsewhere in this issue, and turn to record the birth, in 1899, of two other publications which could also celebrate their semicentennial this year. One of these, the *Physical Review*, published by the American Physical Society which was formed in 1899, has been a landmark in



Curtiss Company

Three decades back, the first airplane flight across the Atlantic was made by the Navy's NC-4 designed by Professor Jerome C. Hunsaker, '12, George C. Westervelt, '06, and Captain Holden C. Richardson, '06. It used four Liberty engines developing 1600 horsepower, had a maximum wing span of 126 feet, and had a maximum speed of 84 knots for 12-ton load or 74 knots for 14-ton load.

publications in the physical sciences since its inception. The other, *Who's Who in America*, the first edition of which contained 8,602 biographies, has been an important reference work on contemporary leaders in all fields of endeavor. Still another publication which first appeared in 1899, but was short-lived, was the *Transatlantic Times*, a four-page newspaper first published at sea aboard the American liner *St. Paul* on August 8, 1899. News for this brief paper was obtained from Signor G. Marconi's wireless station at the Isle of Wight, 36 miles from the *St. Paul*.

Turning away from publications, we may recall that on January 24, 1899, Humphrey O'Sullivan in Lowell, Mass., obtained a patent for the first rubber heel on shoes. Meanwhile in Boston, Simmons College for women was chartered in 1899, three years before it was opened to students. In Hartford, the Hartford Electric Light Company is said to have been the first to use aluminum commercially for its transmission lines to bring power from its power plant at Tariffville to Connecticut's capital city. In the automotive field, the B. F. Goodrich Company of Akron made the first automobile clincher tires, and the self-starter was invented, making hand cranking unnecessary.

Forty years ago the first outboard engine was invented. The engine was a single cylinder one, weighing less than 50 pounds and developing one and a half horsepower. Also in 1909 appeared the first concealed beds which were swung on a pivot and hidden by doors or closets.

Three other events of 1909 – destined to influence the lives of Americans for many years to come – should be recorded. The income tax amendment to the Constitution was proposed to the various State legislatures on July 12, thereby laying the foundations by which individual wealth might be so redistributed as to put both the "have's" and the "have not's" in the same economic stratum. It was in 1909 that Rear Admiral Robert E. Peary first reached the North Pole. In the same year, radio communication was put to its first real test in saving lives at sea. On January 23 Jack Binns, radio operator of the S.S. *Republic*, transmitted the distress signal when the *Republic* was rammed by the *Florida* off Nantucket Lightship in fog. Although the *Republic* sank as a result of this accident, only four of its 461 passengers were lost.

We skip another decade, to 1919, when this country was, as now, engaged in reconstruction after a worldwide war. Then, as now, aviation was attracting a good deal of attention and several events of note occurred during that first postwar year. On April 19, the first nonstop flight between New York and Chicago was made at an average speed of 106 miles per hour. The Atlantic Ocean was crossed by airplane for the first time in May when the Navy's NC-4 reached Plymouth on May 31 from its base at Rockaway, L.I., N.Y. As recorded in the following paragraphs, this feat has particular significance to readers of this journal. In mid-June came the first nonstop flight across the Atlantic and during the early part of July this ocean was spanned for the first time by a lighter-than-air ship which flew from East Fortune, Scotland to Roosevelt Field – a distance of 3,130 miles, in 108 hours, 12 minutes. Air-mail service to ships at sea was first effected on August 14 when mail was dropped from a plane to the deck of the *Adriatic*, one and a half hours after she had left her pier in New York City.

The Navy's transatlantic flight, in which the Atlantic was first crossed by airplanes, has special significance to Review readers for the part which a number of Technology Alumni played in this event. Perhaps a greater degree of objectivity – and certainly a better grasp of the atmosphere of the time – can be obtained by quoting from copy published at the time. An editorial in the May 1, 1919, issue of *Aviation and Aeronautical Engineering*, two weeks before the flight, comments in part in the following words:

> However, while the greatest credit will justly be due to the men who first succeed in flying an aircraft across the Atlantic, a very great share of appreciation should go to the engineers responsible for the design of the victorious machine.

Reproduction of the first photograph to be transmitted across the Atlantic on December 1, 1924, by the Photoradiogram system devised by Richard H. Ranger, '11. Tests on picture transmission were carried out on a wavelength of 14,200 meters, with a transmitter having a power of 200 kilowatts—four times that of first-class broadcasting stations.

In the case of our NC boats credit for having developed this type of seaplane belongs to Rear Admiral David W. Taylor and Comdrs. G. C. Westervelt ['06], H. C. Richardson ['06], and J. C. Hunsaker ['12], Construction Corps, U.S.N., whose important and successful work in aeronautical engineering particularly fitted them for the arduous task of designing the American competitors for the blue ribbon of the Atlantic – which are incidentally the most powerful aerial scouts of the United States Navy.

Although the NC planes (N for Navy, C for Curtiss) are now remembered primarily for their first transatlantic flight, these ships were first planned to overcome and combat the menace of submarine warfare which, in 1917, began to be quite threatening to United States shipping. Details of the design and construction of these planes are recorded in an article "Progress in Naval Aircraft" by Commander J. C. Hunsaker in the July, 1919, issue of the *Journal of the Society of Automotive Engineers.*

Other events related to aviation which transpired during 1919 include the establishment on June 1 of the first forest aerial patrol by the Department of Agriculture, operating out of March Field, Riverside, Calif., and the Travelers Insurance Company of Hartford, Conn., also issued during this year, the first aircraft liability and property insurance policy. During 1919 there originated in Boston, during Boston's police strike, the white lines designating traffic lanes. They were initially painted on Boylston Street between Tremont Street and Park Square, and were so successful that other cities later adopted this method of regulating traffic.

We break the sequence of events in years ending in 9 to record a few brief events of a quarter century ago when The Review was celebrating its silver anniversary and boasted an editor, managing editor, and assistant managing editor! This was the year in which Cellophane made its appearance and in which – so it is claimed – contact lenses from the Carl Zeiss works in Jena were first imported into this country. Again, however, events in aeronautics formed an important part of the year's highlights in science and engineering. The installation of airway beacon lights made night flying possible for the first time so that on July 1 transcontinental air-mail service (as contrasted to the airplane-train service which had been operating since 1920) became possible between New York and San Francisco. During this year a Round-the-World Flight of the United States Army planes covered 26,103 miles in 175 days, with a flying time of 351 hours, 11 minutes. During this trip, the first transpacific flight was made in May. Also, in 1924, the first transcontinental voyage by lighter-than-air craft was made when the *Shenandoah* left Lakehurst on October 7 and arrived in San Diego, Calif., on October 11.

On December 1, 1924, the Atlantic was spanned in quite another, but equally significant, way when Captain Richard H. Ranger, '11, transmitted pictures by radio from London to New York in a radio picture service, called Photoradiogram, which he established for the Radio Corporation of America. A reproduction of the original photograph to be transmitted officially over the system is shown on this page. It required 20 minutes to transmit the three and a half by five-inch portrait of President Coolidge. In making this illustration available for use by The Review, Mr. Ranger writes: "It was originally sent from London to New York at that time [December 1, 1924]. I should add that it was the first official picture; the boys slipped one over me and the actual first was one of myself, but that naturally was just a test to see what the equipment would do. We all gathered around the instrument on the fifth floor at 66 Broad Street in New York City. A tiny little pen had been made for us by Waterman's which tapped out the dots of the picture on a piece of paper carried by a revolving drum. On the other side of the Atlantic the tapping of the little pen was started by the massive tapping of some six lever switches connecting the 200-kw Alexanderson alternators to the antenna as controlled by the sensitive photo-cell on the photo transmitter."

Shortly after the demonstration of the Ranger system, pictures were transmitted by radio from Washington, D.C., to Boston by C. Francis Jenkins.

Just before all this took place, The Review was celebrating its 25th anniversary. H. E. Lobdell, '17, was editor, ably assisted by Eric F. Hodgins, '22, managing editor, the late Professor Robert E. Rogers, contributing editor, and Raymond Stevens, '17, as business manager. A major portion of the anniversary issue was devoted to the chronicling of events as recorded in

(*Concluded on page 188*)

Fifty Years
BEFORE THE MASTHEAD

Upon the Attainment of Its Golden Anniversary, The Review's Progress for Five Decades Is Recorded

By H. E. LOBDELL

FIVE days before Christmas of 1898, the first number of The Technology Review, a quarterly magazine of octavo format edited by Arthur T. Hopkins, '97,* was published. Chaste in typographical layouts designed by the Colonial Press of C. H. Simonds and Company, the 143 text pages of Volume I, Number 1, dated January, 1899, were printed on Warren's finest rag paper, and wrapped in a chocolate-brown cover — the characteristic "brown pinafore" (as one of Mr. Hopkins' successors called it) which The Review was fated not to discard for nearly a quarter of a century. Publicly, however, the initial bow and blush of the "new Review" was delayed 11 days until December 30, at the annual dinner and meeting of the Alumni Association held at the Exchange Club, Boston, with an attendance of about 120. There, when "copies . . . were placed before the members. . . . the favorable comment elicited brought gladness and new courage to the hearts of all concerned."

Besides Mr. Hopkins, three other gentlemen were immediately concerned: Professor C. Frank Allen, '72,* James P. Munroe, '82,* and Arthur D. Little, '85,* who constituted the Committee on Publication, a committee be it noted, not of the Alumni Association but of the Association of Class Secretaries. The Alumni Association, organized March 17, 1875, with an initial membership of 122, thereafter held a yearly meeting and dinner and played a part in connection with the Institute's commencement program, but otherwise remained relatively inactive until the formation of the Alumni Council in 1909. The Association of Class Secretaries, on the contrary, from its beginning on November 4, 1896, with a membership of around 30, was the *working body* most active in alumni affairs for the next dozen years.

It was, therefore, to a meeting of the Class Secretaries on February 1, 1897, that Dr. Little broached the "matter of a proposed publication"; whereupon he, together with Messrs. Allen and Munroe, were appointed a committee "to consider . . . and report." Dr. Little, writing 25 years after the event, stated that The Review "had its conception in the desire to provide a clearing house for Technology news, a forum for discussion of Technology affairs, and a dignified medium for presentation of those larger interests and problems with which Technology men in their relations to the affairs of the community were particularly concerned. . . . The need and opportunity for a publication of the sort proposed was recognized by the Committee from the start. Its discussions, therefore, were concerned only with questions relating to the form and character which the publication should take and the means of bringing it into being." Hence, after reporting progress at further meetings in the following October and December, Dr. Little asked permission to go ahead and on May 3, 1898, the Association of Class Secretaries voted unanimously that the committee of which he was chairman,

> . . . be and hereby is empowered to proceed and publish the said Review on behalf of this Association, . . . [and] is hereby authorized to engage for one year a suitable editor, at a salary not exceeding $600 a year, and to expend for the purposes of said publication such amounts as may be received from advertisements and subscriptions. And said Committee is further authorized to borrow, on behalf of this Association, such sums in anticipation of publication not exceeding $500 . . . as may be necessary.

Consequently, before the end of 1898, with $1,000 generously advanced by Mrs. William Barton Rogers as a guarantee fund (half being a loan, later repaid), The Review was launched by its trio of godparents, two of whom were already notable in Institute annals. Professor Allen in 1875 had been one of the charter members of the Alumni Association, of which he and Mr. Munroe, respectively, had been secretary in 1890–1892 and president in 1894–1896. Moreover, 11 years earlier than 1898, Professor Allen's active span of nearly 40 years on the Faculty in the Department of Civil Engineering had started, and in 1897 Mr. Munroe had commenced the 32 years he was to serve as a life member of the Corporation, of which body he was to become secretary in 1907. As for Dr. Little, his far-sightedness in proposing the establishment of The Review betokened the later honors that he would receive, honors such as the presidency of the Alumni Association in 1921–1922 and membership on the Corporation from 1912 until his death in 1935.

Despite its distinguished sponsorship and the welcome accorded its first number, however, subscribers to the fledgling magazine were few in number during 1899, and its advertising revenues were equally scanty. After paying the printer and the papermaker, and the editor's salary, outgo exceeded income to a point that the committee "had to report a deficit of $1,100" on the operations of Volume I. The situation patently called for retrenchment, and neither the committee nor the editor flinched. Mr. Hopkins yielded the chair to Walter Humphreys, '97, who ed-

* Deceased

THE REVIEW EDITORS

Of Its First Half Century, Arranged in Order of Their Initial Appearance on Its Masthead

Name	*Title*	*Year and Vol.*
*Arthur T. Hopkins, '97	Editor	1899 Vol. I
Walter Humphreys, '97	Editor	1900 Vol. II, No. 1
*James P. Munroe, '82	Editor	1900–1908 Vol. II, No. 2–Vol. X, No. 2
*I. W. Litchfield, '85	Editor	1908–1917 Vol. X, No. 3–Vol. XIX, No. 5
*Walter B. Snow, '82	Adv. Mgr.	1914–1922
*Robert E. Rogers	Editor	1917–1922 Vol. XIX, No. 6–Vol. XXIV, No. 3;
	Contrib. Editor	1922–1928
H. E. Lobdell, '17	Editor	1922–1930 Vol. XXV, No. 1–Vol. XXXII, No. 8;
	Publisher	1930–
Eric F. Hodgins, '22	Managing Editor	1922–1927
Raymond Stevens, '17	Adv. Mgr.	1923–1924
John E. Burchard, '23	Asst. Editor	1924–1925;
	Editorial Asso.	1933–1943
*Richard W. Kenison, '24	Adv. Mgr.	1924–1925
J. J. Rowlands	Contrib. Editor	1925–1932;
	Editorial Asso.	1932–
James R. Killian, Jr., '26	Asst. Mng. Editor	1926–1927;
	Mng. Editor	1927–1930;
	Editor	1930–1939 Vol. XXXIII, No. 1–Vol. XLI, No. 3;
	Editorial Asso.	1939–
John D. Crawford, '27	Asst. Mng. Editor	1927–1929
Ralph T. Jope, '28	Circ. Mgr.	1928–1929;
	Bus. Mgr.	1929–
Tenney L. Davis, '13	Editorial Asso.	1933–1941; 1946–1948
Philip M. Morse	Editorial Asso.	1936–1947
Frederick G. Fassett, Jr.	Editorial Asso.	1937–1939;
	Editor	1939–1945 Vol. XLI, No. 4–Vol. XLVII, No. 8;
	Editorial Asso.	1945–1946
Paul Cohen, '35	Editorial Asso.	1938–
Edward R. Schwarz, '23	Editorial Asso.	1942–1947
Willy Ley	Editorial Asso.	1944–
Frederic W. Nordsiek, '31	Editorial Asso.	1944–
David O. Woodbury, '21	Editorial Asso.	1944–
B. Dudley, '35	Editor	1945–Vol. XLVII, No. 9–

* Deceased

ited Volume II, Number 1, at a reduced salary, and then Mr. Munroe became The Review's third editor, his tenure lasting through nearly nine years – all without salary.

"I am appalled," Mr. Munroe reminisced in The Review's Silver Anniversary number of January, 1924, "at my hardihood in undertaking the combined offices of stepfather, nurse, 'professor' of deportment to The Review. I adopted the waif at the age of one, when it was moribund from financial starvation, and, with little experience and less leisure, agreed to provide for it a makeshift home in my business office. This was on the dubious supposition that translation from the academic groves of Newbury Street to the harsh atmosphere of trade might keep the poor thing alive. In . . . that second volume, the editorial page – which, as the English say, 'was me' – entered an alibi by protesting that 'no child is interesting till it is three years old,' believing, of course, that the anaemic orphan would be off my hands ere then. Mark Twain (or was it Bret Harte?) defined a mining camp gentleman as one who 'never shook his mother.' Perhaps it was kindred hyper-delicacy that postponed my 'shaking' The Review till it was nearly ten years old."

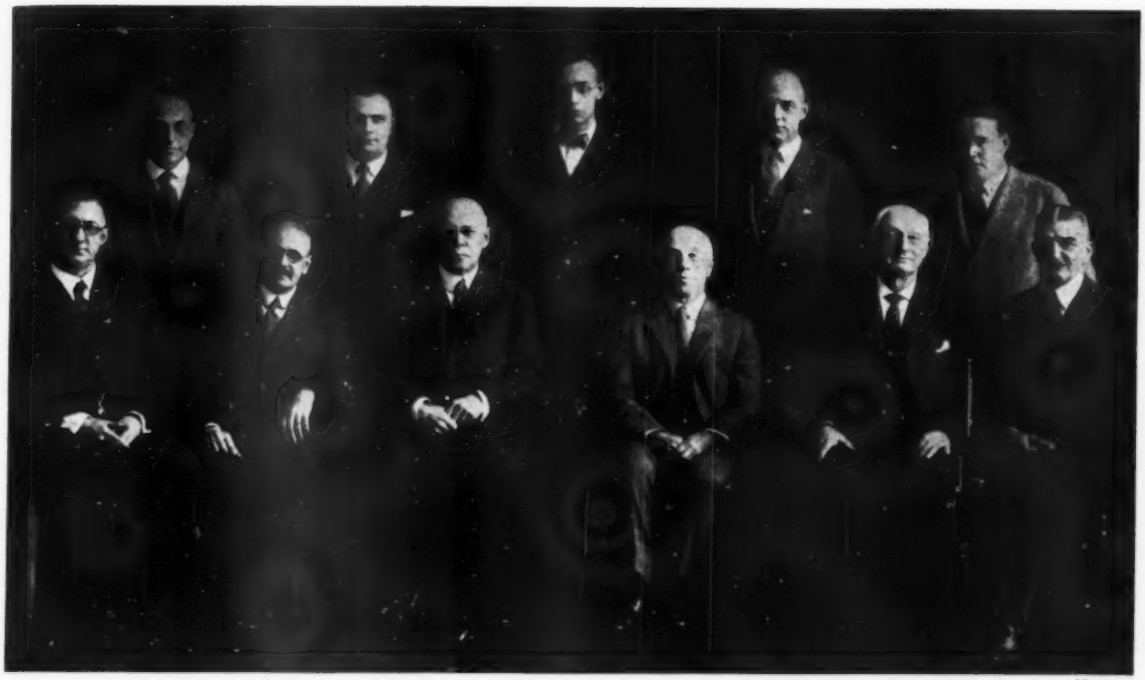
Of Dignified Tone

To look back upon his editorship in such fashion was characteristic of Mr. Munroe's quizzical modesty (as well as of the potentialities of his deft and facile pen), even as it was for him to re-emphasize the "unflagging aid of his colleagues on the Committee on Publication: Allen, '72,* [Walter B.] Snow, '82,* Little, '85,* [Arthur A.] Noyes, '86,* [Leonard] Metcalf, '92,* and Humphreys, '97." Yet it was Mr. Munroe himself, and much more so than any other single individual, who earned for this magazine the prestige and respect it commanded from its alumni audience during that formative first decade. To be sure, in that decade the audience was not large numerically, for up to 1900 the Institute had granted less than 2,200 degrees, but during Mr. Munroe's tenure the subscription list grew from less than 1,000 to over 1,500 – to be exact, 1,607 for Volume X in 1908.

As a "clearing house for Technology news, a forum for the discussion of Technology affairs," The Review's tone in those days was uniformly sober, serious, and dignified, as befitted a period of great crisis. For at the opening of the Twentieth Century, the Institute was "face to face with stubborn facts which cried for removal" from the Back Bay to a new site; and confronted by a despairing lack of funds not only for that purpose but to preserve its actual independence against a threatened "Merger" with Harvard University. Mr. Munroe recalled:

> The one never-forgotten objective of The Review was, however, to do its full share in welding past and present students into a militant organization eager to work wholeheartedly for the Institute's upbuilding along the lines so clearly laid down by its founder, Rogers, and its preserver, Walker. Essential to this development were, on the material side, absolute independence, and, on the intellectual side, that breadth of view and that roundness of training which are so inadequately expressed by the word "culture."
>
> Fortunately – though the Merger seemed at the time a genuine disaster – the nebulous good-will of the Alumni was shocked into dynamic action, in the winter of 1903–1904, by persistent rumors of impending marriage with Harvard University. Such a cure for Technology's chronic poverty had been many times suggested and, in 1878, when the Institute was in almost desperate straits, had come within an ace of acceptance. It had been tentatively broached again in 1898, soon after President Walker's death; and the establishing of the Association of Class Secretaries and The Review had been not a little hastened thereby. Not, however, until that magazine was nearly five years old, did the wooing of Harvard become active, and therefore serious. . . .

* Deceased



Notman

This photograph which originally appeared in The Review's 25th anniversary number of January, 1924, brought together those who had a hand in the founding of The Review or in its administration during its first quarter-century of publication. Seated, in reading order, are: *Arthur T. Hopkins, '97, first editor; Walter B. Snow, '82, in charge of advertising in The Review's early days; Arthur D. Little, '85, chairman of the Committee on Publication which brought The Review into being; James P. Munroe, '82, third editor, and member of the Committee on Publication; C. Frank Allen, '72, third member of the Committee on Publication; and I. W. Litchfield, '85, The Review's fourth editor. Last living member of this group was Mr. Allen who had promised to prepare a manuscript for inclusion in this issue a few weeks before his death last June.* Standing, left to right, are: *Walter Humphreys, '97, second editor, and Secretary-Treasurer of the Alumni Association for more than 16 years, and now Secretary-Treasurer of the National Association of Wool Manufacturers; H. E. Lobdell, '17, sixth editor, from 1922–1930, and now The Review's publisher, in addition to his position as executive vice-president of the Alumni Association; Eric F. Hodgins, '22, managing editor, 1922–1927, who is now a member of the board of editors of* Fortune; *Raymond Stevens, '17, advertising manager, 1923–1924, President of the Alumni Association, 1944–1945, and now director of Arthur D. Little, Inc.; and Professor Robert E. Rogers, fifth editor, and, until his death in 1941, Professor of English at the Institute.*

Volumes VI and VII, when the Merger pot was boiling, were the banner years of this particular editorial service. Verbal ammunition was pouring in from all sides; the Corporation, which showed a substantial majority in favor of an alliance; the Faculty, which showed an overwhelming majority against; and the Alumni and undergraduates who, whatever their legal rights, or want of rights, insisted upon being heard – all these crowded into the narrow confines of The Review with every sort of argument. . . . The Review took just pride in the acknowledged fact that in this furious *melée* it kept the controversial rudder true, gave equal space to friend and foe, and never tried, by suppression or innuendo or personal sneer, to turn the scale either way. So, while the Merger fight made many an honorable wound, it left no festering sores of personal bitterness. The champions on either side found their respect for their opponents strengthened by the mutual drubbing; and, after the smoke of battle had lifted, all of them discovered, what only a few up to that time appreciated, that the Institute of Technology is a most precious possession, well worth fighting for, well worth working for, and needing only adequate endowment, an ample location, and Alumni as devoted as the school's self-sacrificing Faculty, to become in actuality what Rogers and Walker had visioned it in splendid prophecy.

Mounting Interest

By 1908, there were twice as many graduates and former students as there had been 10 years earlier, but the mounting intensification of interest by the Alumni in the Institute's destiny during the first decade of the 1900's was not to be measured by sheer increase of numbers. The diligence of the members of the Association of Class Secretaries, collectively and individually, had successfully fostered many endeavors in addition to The Review, such as the All-Technology Reunion of 1904, obtaining subscriptions which totaled $100,000 toward a future Walker Memorial, and promoting the activity of local associations (today known as M.I.T. Clubs) of which there were then 21 distributed across the country.* When Walter B. Snow, '82, a prime mover in organizing the Association of Class Secretaries, became president of the Alumni Association in 1908, it was, therefore, but natural that he advocated appointment of a joint committee to study how the effectiveness of the existing relationships between those two bodies might be improved. By then, too, most surviving factional differences over the Merger question (save as footnotes to an interlude in Institute history) were displaced by enthusiasm over

* Chicago (formed in 1887), Denver (1889), New York and Springfield (1895), Philadelphia (1897), Buffalo (1898), Pittsburgh and Washington (1899), Cincinnati and Lawrence-Lowell (1901), New Bedford (1904), Hartford (1905), Cleveland (1906), Harrisburg, Los Angeles, New Orleans, San Francisco and Syracuse (1907), Detroit, Portland (Oregon), and Seattle (1908).

the impending inauguration of Richard C. Maclaurin, during whose administration increasing reliance would clearly be placed upon support from the Institute's Alumni.

As a consequence of recommendations submitted by Mr. Snow's joint committee, in December, 1908, the Alumni Association adopted a new constitution by a vote of 659 to 3, and this document provided for an Alumni Council composed as follows: the officers and Executive Committee; and the secretary of, or a representative from, each graduate class and each local association. The Alumni Council, which held its organization meeting on May 12, 1909, immediately became the *working body* most active in alumni affairs, in succession to the Association of Class Secretaries.

Coincidentally, management of The Review passed to the Alumni Association at the end of 1908, and in the previous summer Mr. Munroe obtained his long-sought and well-merited relief, being succeeded by I. W. Litchfield, '85.* In addition to the appreciation of Mr. Munroe's editorial achievements already noted, it is worthy of record that he wiped out the $1,100 deficit on Volume I and repaid the loan advanced by Mrs. Rogers within two years, and then carried on so skillfully that The Review's net final deficit accruing to the Association of Class Secretaries in 1908 amounted to only $106.53. No wonder the Class Secretaries tendered an elaborate dinner in Mr. Munroe's honor and, as he phrased it, "poured into his ears golden and silvern speeches of which he was most unworthy; and showered him with a superb silver service which is his most treasured possession, and with gold for books to an extent he never before had seen."

Under New Management

As The Review's fourth editor, from 1908 to 1917, Mr. Litchfield received a modest annual honorarium, but he was by no means a full-time editor. During those years he was also field manager of the Alumni Association and the number of local associations increased from 21 to 52; and on him fell main responsibility for organizing the All-Technology Reunions of 1909 and 1916. It was truly a fabulous era for the Institute, an era ushered in by a gift of $500,000 toward a new site from Coleman du Pont, '84* followed by Dr. Maclaurin's announcement that a "mysterious Mr. Smith" had provided $2,500,000 for new buildings, and climaxed at the Dedication Reunion of the "New Technology" in June, 1916, by gifts totaling another million from eight Alumni – $500,000 from Pierre S. du Pont, '90; $100,000 apiece from three other du Ponts (Coleman, '84,* Irenee, '97, and Lammot, '01), and from Charles Hayden, '90;* $50,000 from Edward D. Adams, '69;* and $50,000 jointly from Charles A. Stone, '88,* and Edwin S. Webster, '88.

To keep abreast of the never ceasing succession of newsworthy events, Mr. Litchfield persuaded the Executive Committee of the Alumni Association during 1911–1917 to supplement the regular quarterly issues of The Review by publishing each year five "thinner in-between numbers." In this way, he managed especially to post his readers more promptly with the unfolding plans for and construction progress on the new site. Meanwhile, The Review gained readers, and for Volumes XI to XIX the average net paid circulation rose to 3,288; while the average annual gross advertising likewise doubled, to $2,644 for the period 1909–1917 – thanks largely to Mr. Snow who formally became The Review's advertising manager in 1914. And, although production costs rose at a faster rate than did receipts from circulation and advertising, so that the magazine showed an operating loss in each of the nine years save one, the Executive Committee paid the accumulated net deficit, amounting to $8,444 for the period, without complaint in recognition of the fact that the editor had so markedly expanded the size of its alumni audience.

In the late spring of 1917, Mr. Litchfield left for Washington to become associated in the classification of personnel for war industries, a problem which, though lesser in its magnitude than during World War II, was no less pressing or complex when the unprepared United States declared war upon the Central Powers. Succeeding Mr. Litchfield as The Review's fifth editor, from 1917 to 1922, Professor Robert E. Rogers, of the Department of English and History, was pressed into the breach because, in his own words, he had "been imprudent enough, the July before, to write almost the entire record of the Dedication Reunion. And when the war came it was held against me. . . . For Litchfield the magazine had been a useful means of working up enthusiasm for the things the Alumni were doing, the chief instrument in getting the Alumni behind such vast projects as the Dedication Reunion. I had no such responsibilities or opportunities. My job, as I saw it . . . was to cram into The Review quarter by quarter, every shred of information I could lay my hands on which concerned Technology and would interest Technology men. The result was, I am inclined to grant, a scrapbook, but an extraordinarily rich scrapbook."

Following the armistice of 1918, with the attention of more and more Alumni focused on the Institute because of the Educational Endowment Fund campaign of 1919–1920, as a climax to which the identity of "Mr. Smith" as George Eastman was disclosed, The Review's audience rose to newer levels. During Volumes XX–XXIV (1918–1922), which Professor Rogers edited, the average paid circulation rose to

SUMMARY OF REVIEW CIRCULATION AND ADVERTISING
(Averages by Five-Year Periods)

Volumes	*Years*	*Net Paid Circulation*	*Gross Advertising*	*Profit or Loss*
I–V	1899–1903	1,123	$ 1,575	$ 54
VI–X	1904–1908	1,401	1,335	75*
XI–XV	1909–1913	3,068	2,446	602*
XVI–XX	1914–1918	3,718	2,893	1,099*
XXI–XXV	1919–1923	5,781	4,703	279*
XXVI–XXX	1923–1928	7,089	10,451	2,868
XXXI–XXXV	1928–1933	8,187	13,583	5,655
XXXVI–XL	1933–1938	7,843	12,765	3,502
XLI–XLV	1938–1943	9,897	16,012	5,409
XLVI–L	1943–1948	11,434	34,666	7,553

* Loss.

* Deceased

HALF A CENTURY'S PROFIT AND LOSS SUMMARY

Volumes	*Years*	*Period of Profit or Loss*	*Amount*	*Net Total*
I–X[1]	1899–1906	4 years	$ 1,975*	
(40 numbers)		6 years	1,868	$ 107*
XI–XXIV[2]	1909–1922	13 years	11,791*	
(90 numbers)		1 year	419	11,372*
XXV–L[3]	1922–1948	26 years	125,911	
(226 numbers)		0 years	—*	125,911
Total for the Half Century				
I–L	1899–1948	33 years	128,198	
(356 numbers)		17 years	13,766*	114,432

[1] As a quarterly under the Association of Class Secretaries.
[2] As a quarterly under the Alumni Association – with supplementary in-between numbers during 1911–1917.
[3] As a monthly under the Alumni Association.
* Loss.

5,418, and the average yearly income obtained by Mr. Snow from advertising climbed to $3,327. Nevertheless, for each of these five years, the Alumni Association's Committee on Publication was obliged to report an operating loss, the total of these for the period being the amount of $2,928.

Professor Rogers always considered himself an appointee *ad interim*, and had "long urged that a quarterly could no longer take care of the news of Technology and its Alumni. The issues were full to bursting already. What was needed was a monthly . . . full-time men at work upon it, a business manager and an advertising manager, and a policy. . . ." Finally, Professor Rogers' counsels prevailed in the spring of 1922 – when by one of those coincidences of the record, the chairman of the Committee on Publication was the same Arthur T. Hopkins, '97,* who had been The Review's first editor, back in 1899.

At this juncture, Mr. Hopkins invited me to become The Review's sixth editor, which offer I accepted; and on my own behalf, I invited two members of the then Senior Class of 1922, Eric F. Hodgins and Albert J. Browning,* respectively, to become associated in the transformation of the editorial and business phases of the magazine from a quarterly into a publication appearing monthly throughout the academic year. Presumably, Mr. Hopkins turned to me on account of my having been general manager of *The Tech* during 1916–1917 rather than because of my prewar exposure to the study of architecture, or because in 1921 I had been appointed assistant dean; and certainly, Eric Hodgins, who accepted my offer, knew that in making it I was much more impressed by the talent he currently displayed as editor of *Voo Doo* than by whatever acquaintance I supposed he might have acquired with chemical engineering during his undergraduate passage along the route of Course X. Al Browning, by contrast, was more balanced in his background than either of us, for he was general manager of *The Tech* and on the verge of graduation from Course XV; and perhaps it was this combination of qualifications which prompted him to decline my invitation and embark directly on his notably successful career in industry – a career climaxed by his wearing a star in World War II during which he was director of purchases for the Army, and afterward with the Ford Motor Company, of which he was vice-president and director of purchases when fatally stricken last spring.

Dated November, 1922, the first number of Volume XXV, therefore, appeared, with Eric Hodgins as managing editor, aided and abetted by such help as I could provide – in a new format, 9 inches by 12 instead of octavo, numerous illustrations being intermixed with its text – and with a new style of cover. Concurrently, in the autumn of 1922, all extant examples of the "brown pinafore" The Review had worn from Volume I through Volume XXIV were relegated to the garret, that is to say, they were removed to storage in the rotunda between the inner and outer domes of Building 10, that void where unclassified remnants of Institute memorabilia are permitted to acquire a dusty patina.

From the start, the revamped Review appealed to its readers, generally speaking, or else they silently accepted what was; but there were those who dubiously wagged their heads. To these latter, the changes epitomized the uncertainties they felt about the younger generation in that jazzy Coolidgean epoch of prosperity and prohibition, which a then blossoming novelist fancifully labeled The Plastic Age. So, certain reactionary readers were self-convinced they missed the old outer garment, a few were irked because the old octavo size better fitted their bookshelves, and others winced every now and then, and not without reason, at what they read. For, while the new editors were ever mindful that the traditional dignity of The Review must be jealously guarded, and they were ever wishful to continue to enjoy the respect of their subscribers, yet, it can be publicly admitted in hindsight, they were anxious not only that what they wrote be read but that it be talked about.

Review Revamped

Hence, columns of The Review at times tended to stress the more vivacious aspects of what was being reported, which upon occasion led to the accusation that The Review was saucy rather than sprightly. But is there today a reader of The Review of the early 1920's – one, for example, still able to sit up and take nourishment in 1949 – who will not relish being reminded of how the managing editor "did" the annual dinners in New York or Boston? Or, of *some* of his editorials, or of the zest with which he pin-pointed "the oratorical triumph of the evening" in publicizing the monthly deliberations of the staid and august Alumni Council? [And, Eric, can you not still relish the anguished remonstrances of the Council member you turpentined in unbold Bodoni (or was it Caslon?) for larding his remarks with insistences that everybody present be sure and call him the next day on his telephone, the number of which I can still hear him saying was "Congress 635"?] In the main, though, the changed Review quickly caught on with its audience, which crossed the 7,000-mark within two years, and soared to over 8,000 net paid within another five. And the Executive Committee of the Alumni Association, in time becoming accustomed to a succession of annual operating profits instead of deficits, happily dissolved the Committee on Publication and left the editors to fend for themselves as best they could.

* Deceased

Bachrach

James R. Killian, Jr., '26
Editor of The Review, 1930–1939

Shown here are past editors of The Review whose blue-penciling activities postdate the taking of the photograph on page 157.

In 1930, Dr. Killian succeeded Editor Lobdell as wearer of the editorial mantle. The Review's loss of its seventh editor was the Administration's gain when Dr. Killian became executive assistant to the president in 1939, and, last October, president of M.I.T.

Frederick G. Fassett, Jr. spent many youthful days in the plant of Maine's Waterville Sentinel *before becoming The Review's eighth editor. He became director of the Office of Publications and Public Relations, Carnegie Institution of Washington in 1945.*

Bachrach

Frederick G. Fassett, Jr.
Editor of The Review, 1939–1945

Surely, no titular editor of The Review, such as I was in the 1920's, could truly deserve being blessed by such able managing editors as Eric Hodgins (to whom *Fortune* was then just another magazine, and who had yet to meet Mr. Blandings and for him to build his dream house) or James R. Killian, Jr., '26 (who then never dreamed where he would wind up in 1948). Nor by steadfast encouragement from a contributing editor such as John J. Rowlands (recently from the United Press, but then not aware he would years later draw upon experiences of his earlier youth to write *Cache Lake Country*). Nor, by having on the business side such colleagues as Raymond Stevens, '17, who, in the brief months he stayed, made it necessary first to use five figures in reckoning a volume's advertising gross (and who then did not dream he would ever be president of the Alumni Association, which he did become in 1944–1945) and Ralph T. Jope, '28, who joined The Review fresh from Course XV and absolutely confident that in some future year it would carry $20,000 of advertising (though then not even he did dream he would sell over $36,000 worth of space in each of the last three years of The Review's first half century).

Golden Age

Increasingly after I was appointed dean of students, it appeared more consonant with reality that Mr. Killian become The Review's seventh editor without further delay, I being denoted thereafter on the masthead as publisher; and this shift took place at the end of Volume XXXII in July, 1930. It was under Mr. Killian's editorship that the truly golden age of the modern Review began, through extending the purview of its columns to embrace material relating generally to the unfolding march of progress in science and technology, as well as to accomplishments within the confines of the Institute and achievements by its Alumni. After Mr. Killian became Dr. Compton's principal colleague this broadened editorial policy was maintained and further enriched by his two successors: Professor Frederick G. Fassett, Jr., of the Department of English and History, the eighth editor, from 1939 to 1945, when he departed for Washington to become reassociated with Vannevar Bush, '16; and B. Dudley, '35, the ninth editor, who came in 1945 from the McGraw-Hill publication, *Electronics*.

Under each of these three editors, the third clause of the original "conception," which Dr. Little and his Committee on Publication had for The Review back in 1899, was thus realized: namely, that it serve also as "a dignified medium for presentation of those larger interests and problems with which Technology men in their relations to the affairs of the community are particularly concerned." And, parenthetically, each of these three while in the chair enjoyed that experience very dear to an editor's heart: namely, mounting "reader interest" tangibly expressed by the circulation curve breaking into new realms, by its passing the 9,000 mark for Mr. Killian and the 10- and 11,000 marks, respectively, for Messrs. Fassett and Dudley.

In Mr. Killian's time, though his nine-year span included the depths of the depression, the pages of The Review, always on the choicest of heavy-coated paper, invariably betrayed a splendor and felicity of layout and illustration hitherto unknown. To be sure, during the worst of it, despite all that Mr. Jope could do, revenues did dip downward, but never was the editor obliged to curtail to a degree incommensurate with his artistic taste, nor with the higher standards he was establishing for the magazine's textual content. Professor Fassett could, and did, carry forward The Review's already improved editorial stature, but he was perforce obliged to forego a corresponding embellishment of his columns by such sizable half-tones or lavish typographical treatment. In his time, he was confronted by a war rather than a depression: the handsome plate paper was no longer obtainable, and in the

(*Concluded on page 184*)

Gravel

By **F. G. FASSETT, JR.**

This day we have been hauling gravel –
Ten tons loaded, moved, and placed –
Ten tons of the rocky bones of earth
Shoveled up, transported, dumped a half-score miles away,
Once more to settle, pack down, find a level.

Indeed, our need is for no Archimedes
To calculate disturbance in the planet's orbit
Occasioned by this microcosmic cataclysm.
What is Earth's weight?
Against it to balance one hundred ton-miles
Of transfer mocks beyond triviality.
Ten tons, ten miles, loaded, hauled, and placed:
No nebulae will unroll in marvel spirals,
No Joshua's deed was this, to halt the sun,
Or even by a microsecond alter the universal round.
But in such terms as these we are not held to deal.

When fog still floated coldly light along the lake,
In the raucous truck with a roar we rocketed
Down the road from the woods, and across the town,
Into the rising sun from the river, between fields
Still damp, past houses still bright from night's clean air,
With a bang down the pitch, with a clash across the ledge,
While the idle shovels clattered and crashed
In the empty body behind us, and an early cow
Stared in exasperation from pasture's moisture,
And an early man was a round mouth.

White ruts between white-daisied green
Across the flat meadow, then sudden up.
Twist on the bend, with off wheels grabbing for a hold,
Then down, plunge, rattle, slat, and plunge,
So into the pit, into the heart of the hollow hill,
Damp yet, and dark, where night still brimmed to the full.
No one there before us – no one? Here, a sometime wheel,
Hub, random spokes, a broken felloe;
There, rusty iron and gravel-grey wood, what once was a shovel;
And everywhere the crisscrossed tracks of others' wheels –
And back of them in time, how many more,
Whose once hot sweat long since has sunk
Far, far beneath the pit's cold floor
Even as their bones are settling in the earth
Of burying grounds in every quarter of the town.

But none was there.

First comers, first choosers in that chill Venusberg
That day, and so we singled out
A rich part of the tapered gravel wall
Rising sheer from the floor, to which the truck
Could be close snugged. We backed and filled,
And eased up to the bank, ready to mine a load.

Far up above, the sky rested like a blue-lined lid
Flat across the pit's high crest from rim to rim,
Trapping us upon the floor of rock and sand,
With but the circling wall,
Shell of the hollow hill, to hold the sky
From crushing us beneath.

It took a kingfisher to end that notion,
Rising from jagged black lines that were a dead birch stub
Slanting on the high pit's topmost rim,
Rising against the blue, driving the blue
Upward before him with a dry rattling cry
As he went to warn the river that men were at their work again.

Now a man's heart sings
When his shovel rings
As its load on the truck floor crashes
And the blade he swings
And a new bite flings
Till the rock like water splashes.

And so it was as we filled her up, up to the limit
And beyond, and with a grind of gears pulled away
Across the town, down through the woods, to place the load
Where it was needed, and clatter back through morning dust
To find the hollow hill already tilted
Like a cup and pouring its cool darkness out
While hot light slipped down the western wall,
Discovering again the mass calendrical,
Horizon on horizon piled,
Enforcing order and inheritance
Upon the random stony billions.

Rock that ring on my shovel-blade,
Where is thy brother? In what far heap
Ten thousand score years since fell he as the slow ice
Ground over the bare planet's frame?
Now what a mill was that!
Mountains themselves for the nether stone,
Ten billion billion tons of thunderous frost for the upper,
And a grist of grit-grained granite ground between –
Cliff to crag to boulder to cobble to pebble to gravel to sand to dust,
And the trapped torrents twisting in hidden ways beneath,
And the ridges growing in the cold cramped dark,
And the lone boulders stranger than pine cones
Lost on a treeless desert of mountains.
(Rock, where is thy brother?
Man, where is thine?)
O glaciers of thought through aeons of years
Grinding over the rough mind of man
In flow imperceptible and vast,
And the hidden floods beneath,
Sweeping heaped ridges of words,
And now only the massive moraines of memory
Bearing witness, bearing witness in the mixed wonder of words
To cragged peaks and breathless precipices that were,
To the drummed roll of the vast crushing weight of thought grinding over crude roughnesses of mind
Grinding, grinding it down to drumlin smooth.
(Word, where is thy brother?
Man, where is thine?)

(*Continued on page 186*)

Funding M.I.T.'s Independence

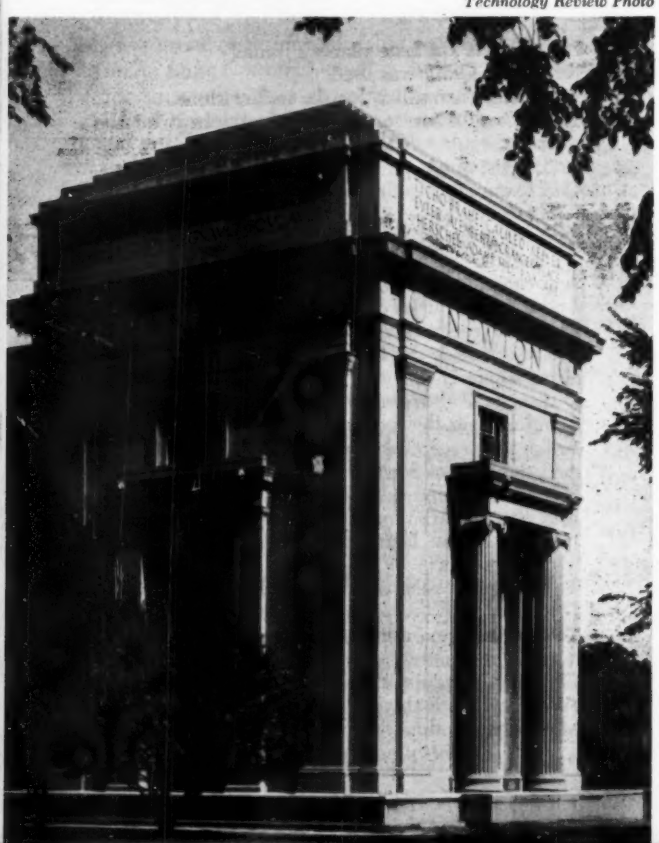
IN opening this discussion of M.I.T.'s Development Program, I wish first of all to express the deep appreciation of my colleagues and myself that nearly 300 of you have taken time out of your busy programs to confer with us during this two-day session. Certainly it is heartening to me, as I undertake the responsibilities of the Institute's presidency, to have this impressive demonstration of interest in the Massachusetts Institute of Technology.

Last September, when I was debating whether I should accept and was qualified to accept the invitation of the Executive Committee that I become president of this great institution, two considerations were controlling: The first was that I would share the Institute's administrative responsibilities with Dr. Compton. I was proud to continue to work with him for the advancement of M.I.T. and reassured by the fact that we were to continue to have his inspiring leadership. The second factor was my faith in the Institute's mission and in its future. I could imagine no greater opportunity for public service on my part than sharing in the continuing development of M.I.T. as one of the great educational institutions of the world.

As we begin our discussions of Institute needs, I am encouraged to feel that enthusiasm for M.I.T.'s Development Program is contagious and commanding. Certainly the plans set forth by the Corporation have stirred us here in Cambridge. Why?

Because they are big plans. The late architect and planner, Daniel H. Burnham, once charged his colleagues to "make no little plans; they have no magic to stir men's blood . . . Make big plans; aim high in hope and work, remembering that a noble, logical diagram . . . will be a living thing, asserting itself with ever growing insistency . . ."

Technology Review Photo



I am sure that you will agree that our Development Program is no little plan. We believe that it is a carefully considered one, a logical diagram that asserts itself with ever growing insistency. It is a diagram of the new facilities and increased resources which the Institute must have if it is to realize its full potential.

How did this Development Program come into being? It started with a study by Administration and Faculty of ways in which the Institute could rebuild its program after World War II, could capitalize on new fields opened up during the war, and could refine and strengthen its over-all educational program. A list of high-priority projects was presented to the Corporation a year ago, and the Corporation responded by appointing a Survey Committee to make a study of the Institute's financial resources and of the tentative list of priority needs which had been presented to the Corporation. Under the chairmanship of John R. Macomber, '97, this committee went to work with great energy, and within three months had completed a report recommending that the Corporation organize to raise $20,000,000 and outlining what the organization should be. The committee informally made two additional recommendations: that we should have an honorary chairman and a chairman of the proposed Committee on Financing Development; and that the right men to fill these important posts were Alfred P. Sloan, Jr., '95, and Marshall B. Dalton, '15, respectively. The acceptance of these two men, Mr. Macomber has remarked, was the most important achievement of the committee, and I certainly agree. We have superlative leadership for the task ahead.

This manifested itself very promptly by the successful response to Mr. Dalton's invitations to men to serve on the Steering Committee and by the willingness of Professor William L. Campbell, '15, to accept the post of full-time executive director and of Ralph T. Jope, '28, to assist him. Throughout these various moves to form our organization, we have had the wise services of Joseph J. Snyder, 2–44, Assistant Treasurer, who joined the Institute's Administration at the end of World War II and took as his first major assignment the task of increasing M.I.T. resources.

Next came the formation of the Committee on Financing Development, one of the recommendations of Mr. Macomber's committee. More than 600 have accepted membership on this committee, a response that augurs well for the success of the Development Program. We have crossed the first big hurdle. We have the men to do the job. We have leadership of the highest order, and we have the loyal support of a wide-ranging group of friends and Alumni.

And now, what *is* the job? What are the opportunities and new conditions which create the need for

Resources to Effect Program of Advanced Learning Free from External Domination Held Need of Educational Institutions

By JAMES R. KILLIAN, JR.

$20,000,000? Let me outline some of the educational objectives and necessities which underlie the planning of the special projects. Our need for $10,000,000 for new buildings and equipment and for $10,000,000 for capital funds rests on the following five imperatives:

(1) *We must insure and stabilize an adequate salary scale for our Faculty.* We can't expect in the long run to maintain a first-team Faculty on second-rate salaries. Despite a number of increases since 1945, our Faculty salaries are still lagging behind the rise in the cost of living. Since 1939, the Consumers Price Index has risen more than 70 per cent, while the annual "take-home" of our staff has risen only 60 per cent. This latter figure would be lower still had not our Executive Committee authorized selective increases this fall in the face of an operating deficit this year, and with the realization that we must find new income in future years to cover the increase.

While this last increase has put us in a fairly strong position relative to all but a few educational institutions, we must insure its continuance and provide for still further improvement, if necessary. I would hope that M.I.T. might finally have a salary scale for which it need make no apologies.

(2) *We must broaden our educational program and provide a well-rounded and complete college community.* While M.I.T. is first and last an institution devoted to science, engineering, and architecture, it has always felt the importance of providing its students with the general education that vitalizes professional training. Throughout the Institute, there is agreement that M.I.T.'s objective is to educate outstanding engineers, scientists, and architects who may become first-class citizens, who have the breadth, understanding, and public spirit to be leaders in their professions, their neighborhoods, and the nation.

Recent years have witnessed at the Institute a marked development, both in emphasis and in extent, of work in the humanities and the social sciences, including economics, labor relations, and international relations. The results are impressive enough to demand that we go farther, and our Faculty has a well-considered plan for doing so.

We believe that we are at a point where a great forward step can be made in professional education by the development at the Institute of a "fourth estate," which will provide for the humanities and the social sciences in a thoroughly adequate way, and place them in a proper relationship to professional subjects. Given proper support in this field, the Institute can pioneer in giving a new dimension to scientific and engineering training, and the ideas developed by our Faculty, if implemented by adequate funds, can influence engineering education in this country greatly.

Let me mention one aspect of this broadened program which is of practical importance to industry. Industry more and more is looking to institutions such as M.I.T. for potential leaders, for the men who must be the managers, the industrial leaders of tomorrow. Graduates of engineering schools often enter industry through a specialized technical channel, with the result that only those few individuals with superior natural endowments rise to top-level posts in management. Industry, because of sound organizational requirements, must insist on specialization among its young scientists and engineers, and is therefore handicapped in increasing the quantity of potential leaders at a time when they are at an impressionable age. When technical education is too narrow, it tends to restrict the supply and development of leaders. By further broadening its teaching program, M.I.T. has an opportunity to contribute to the solution of this problem, so essential to the management of our highly technical private-enterprise system.

Part and parcel of this program for broadening technological education is the provision of more adequate living and recreational facilities. Education is to be found not only in the classroom and laboratory but in the experience of living with one's fellows in an environment stimulating to intellectual activity and conducive to the development of community responsibility. We want to develop an environment at M.I.T. which performs in the broadest sense an educational function itself, not in a passive way but in a dynamic way. The whole complex of living conditions, activities, and atmosphere must be skillfully arranged to provide the kind of environment that contributes to the development of leadership, breadth, and standards of taste and judgment among our students. These

Technology Review Photo

considerations led the Corporation last year to approve the following statement of policy proposed by its Committee on Student Activity:

Resolved. That it is in the interests of a sound educational program at M.I.T. to provide: (a) Dormitories adequate to accommodate the maximum number of students consistent with the housing needs of the student body and a stabilized enrollment at the Institute. (b) Athletic and recreational facilities adequate to accommodate all reasonable needs of student and faculty members who may wish to use them and to permit intercollegiate competition. (c) Facilities adequate for the conduct of extracurricular activities. (d) Administrative personnel adequate for the guidance and encouragement of student activities and athletics and of a balanced extracurricular program for the student body.

It is one of the objectives of our Development Program to provide the funds to carry out this statement of policy.

(3) *Next, we must accept our proper share of the responsibility for making America pre-eminent in science.* Before World War II a majority of the fundamental advances in science came from Europe, while we were content largely to apply and develop these fundamental concepts. America itself must now develop the men who can make fundamental, creative contributions, and we must find the educational means for doing so. M.I.T. for its part must maintain a Faculty of great men, the best who can be found, and must provide them and their students with an environment in which scientific greatness flourishes. Enthusiasm, morale, stimulating associations, academic freedom, and teamwork we have in exceptional measure. But appropriate facilities, both scientific and social, are basic necessities.

(4) *Next, we must maintain our educational leadership.* This is but another way of stating the preceding three objectives, but I would emphasize that leadership is the keystone of our whole structure. We are not, nor do we seek to be, the largest institution in our field; in fact, we believe that we should remain a relatively small institution — a specialty quality shop, as Dr. Compton has remarked, and not a department store. We seek new buildings and new funds not to expand but rather to deepen and enrich our program.

Of course, our student body is now larger than it was before the war, and we shall probably never go back to our prewar size, but we are nevertheless cutting back our postwar enrollment from a high of 5,660 students to a stabilized number of less than 5,000. We believe that the permanently increased demand for higher education in this country, coupled with the development of new fields at the Institute, warrants our maintaining a student body larger than that before the war. This means, however, that we need additional space. In 1940, we had in our permanent buildings 420 square feet per student. On the basis of our present enrollment, this space per student has dropped to 300 square feet. While this is a very rough way of expressing the quality of our facilities, it nevertheless points up one of our objectives in proposing some of the buildings which are listed in our Development Program. We need more space per student to maintain our educational standards.

Not only do we need unexcelled facilities if we are to maintain our educational leadership, but we need constantly to pioneer in new fields. Since the very beginning, M.I.T. has been looking ahead and has been establishing many firsts in the field of education. Our Faculty is now looking ahead to establishing new educational opportunities. Our proposed laboratories for Nuclear Science and Engineering, for Hydrodynamics, for Electronics, for Biology and Food Technology, and for Metals Processing all represent advanced educational thinking. Acquisition of these new facilities will enable new concepts to be put into practice.

(5) *Finally, we must fund our independence as a private institution.* I do not need to point out to this group the effects of inflation and of the decline in investment income rates on endowed institutions. In the 20 years or so that I have been at the Institute, our endowment funds would have had to multiply two and a half times to yield as much income in the form of purchasing power as they did 20 years ago. They have increased only 60 per cent.

In 1940, with 3,100 students, the Institute's endowment per student was over $11,000. Assuming a stabilized enrollment of 4,500, our endowment per student will be $10,000. In 1940, our investment income per student was $500; in 1947, $300. On the basis of a stabilized enrollment of 4,500, it will be $350, still substantially less than it was in 1940.

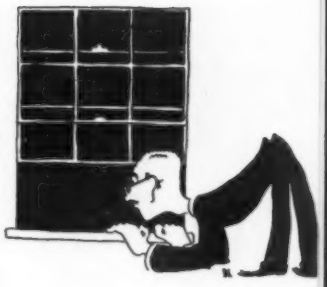
This decrease in the funds available per student can only in the long run spell a decline in our quality of education. There is, in fact, a serious danger that our whole national system of privately endowed institutions will be seriously weakened by current trends. A recent study, for example, shows that in 1920–1921, private contributions to our colleges on a per student basis amounted to $158 per student enrolled, whereas in 1941–1942 they were less than half this amount, namely, $73 per student. According to another study, a typical group of colleges received an average of $52,000,000 a year in new endowment from 1920 to 1930. In the next decade this had fallen to $42,000,000 a year, and from 1940 to 1945 this same group of institutions received only $43,000,000 a year, in spite of the fact that the national income was almost double what it was in the 1930's.

Implicit in this declining support of our privately endowed institutions is the danger of their losing their private status by being forced to accept government subsidy and control. M.I.T. is certainly not immune to this hazard, and I submit that one of our most important objectives in this new Development Program is to underwrite our status as a free institution, to fund our independence.

It is of vital importance that M.I.T., as a pace-setting institution, preserve its freedom and its strength, not only for its own sake but as an example. It should exercise leadership in demonstrating that resources can be obtained under our free-enterprise system for the support of privately endowed institutions. We believe that if M.I.T. is successful in showing that it can command the large-scale support of individuals, of corporations, and of foundations, it will have provided a demonstration heartening to private education throughout the country.

(Concluded on page 194)

How M.I.T. Appears
TO AN OUTSIDER ON THE INSIDE



When a Californian Views a New England College

Scientific Objectivity Finds New Meaning

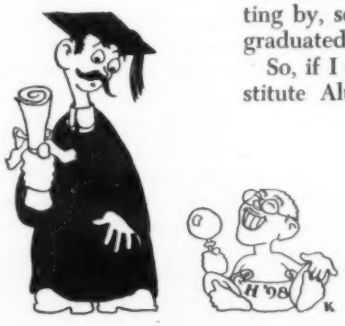
***By* GEORGE R. HARRISON**

On November 19 and 20, some 300 Alumni gathered at M.I.T. to listen to a panel of speakers outline the Institute's postwar responsibilities in the training of scientists and engineers. As recorded on page 110 of the December, 1948, Review, it was at this meeting that announcement was made of the program of the Committee on Financing Development, under Marshall B. Dalton, '15, to raise $20,000,000 for additional endowment and buildings to meet the Institute's postwar needs.

Of the various addresses which were given, none was better received than the concluding spirited remarks by George R. Harrison, Dean of Science, who jovially provided opportunity "to see ourselves as others see us." The Review is pleased to publish Dean Harrison's talk with only sufficient editing to make his remarks as suitable to the reader as to the favored few who were present during the two-day meeting. — Ed.

WHEN the annual Alumni Banquet rolls around I am invited to attend, but I have to sit at a little table marked "Staff," along with the faithful few who are forever barred by fate from aspiring to that honorable title "Alumnus of M.I.T." Of course, I might dedicate four years to amending this situation, but even if I could afford Uncle Horace's tuition, there is some overcrowding here and our requirements for admission are rather rigid, so I doubt that I would be willing to risk contact with the Admissions Office.

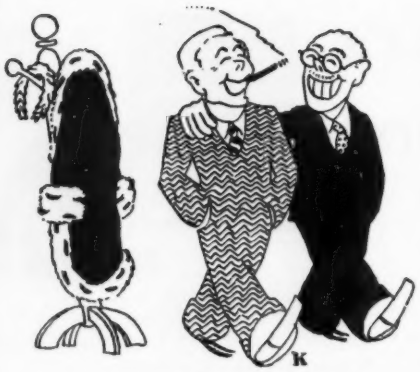
I have tried posing as an Alumnus, but without success. Last year I attended the 50th reunion of the Class of 1898. I walked up to an elderly gentleman of the Class, held out my hand, and said, "How do you do. Harrison, '98." He said, "Good heavens, my friend, you look remarkably well preserved." I saw I was not getting by, so I said, "Sorry, not graduated — born."



I saw I was not getting by . . .

So, if I can never be an Institute Alumnus, I might as well take advantage of the fact and tell you just what I think of the place. To prove that I am competent to serve as an impartial observer, my credentials show that I have served 15 years at two large endowed universities, one eastern and one western (but neither of which plots its endowment and gift curves on a logarithmic basis) topped off by nearly 20 years on the staff at M.I.T. In fact, my period at M.I.T. coincides almost exactly with that of Dr. Compton. I felt, of course, that it would be only polite to let him come here first, but I came myself as soon thereafter as railway transportation could be comfortably arranged. Even before this I had had an opportunity to observe M.I.T. for a while from a vantage point up the river, and I had some pretty definite opinions about it. I have some even more definite opinions about it now. Having been given carte blanche by the committee to tell you the truth and the whole truth, I shall proceed to take full advantage of this unusual opportunity. Perhaps you feel that I am not bold enough to say what I really think. Perhaps you think, "This fellow won't dare give us the real story, even though he isn't tied by bonds of innate loyalty to M.I.T., because he has a job here and will have to go on living with these people he is talking about. Gentlemen, I am a free agent. The Philadelphia Rapid Transit Commission has offered me an option, to be taken up at any time I wish, on an excellent position as a streetcar motorman, so I can leave my job here anytime.

First, let me tell you some things about Dr. Compton. I have wanted to tell him what I thought of him for the last 20 years, but I couldn't because he was president. Now I can. I have a good many friends who have become college presidents, and I know that a college president is a very lonely man. He dons, with his position, a uniform less visible but just as tangible as the lacework Mother Hubbard of an archbishop, and this refractive aura deflects and distorts the simplest human relationships. When a college president has made a speech, nobody can tell him that he has made a good speech; lots of people can say it, and do, but he never can know whether they really mean it or are just trying to "butter him up." Many of them won't say it, because they are afraid he will *think* they are trying to butter him up. Nor does it do much good, after the first two or three times, for the college president to tell one of his professors that *he* has made a good speech. The professor knows the president intends to keep him feeling good, and expects his praise as a matter of course, so the end result is that he merely feels dejected when praise is withheld. This keeps the president worried all the time for fear he will accidentally forget to praise everything. Presidential praise, given or taken, is like the tobacco habit; I am



. . . back to the land of mortals

told that the man who smokes feels, while he is smoking, like the man who doesn't smoke feels all the time.

I know that there have been times when Dr. Compton was wondering to himself, "How am I doing?" and has felt real misgivings as to how he was doing. Actually he was doing fine, but no one in the world could tell him so; he had to find it out for himself. It is a pleasure to welcome Dr. Compton back to the community of mortals.

Since he is again a mortal, I would be shirking my duty if I did not tell you of his greatest fault. He is a "yes man." I don't mean a "yes man" in the usual sense, but in a very unusual sense. After they have been in office one year, let alone 19, most college presidents have a spontaneous reaction of "no" to any request. It is a defensive mechanism that is built into the position, and it is necessary to argue it away before you get anywhere. Dr. Compton always spontaneously reacts with a "yes," and then tries to bring about the desired action. Let me give you an example of how this sort of thing works out.

A few years ago the Budget Committee, which consists of vice-presidents and treasurers and deans and such, worked very hard to balance the budget, and by dint of careful arguing got the last $50 distributed exactly where it should go. The president, of course, was in Washington. After the budget was all balanced, and everybody was feeling fine, Dr. Compton was in his office, open to practically anybody in the world, and was there approached by a professor from one of the departments in the School of Science which shall remain unidentified. This professor was fairly new here, but by previous experience had found that the president was a "soft touch." He knew that if he asked his department head for what he wanted, the answer would be "no," because the department head knew that the dean would say "no," because the budget was balanced and there were no more available funds. So this professor approached Dr. Compton and asked for $5,000 to bring a friend of his who needed a job over from Europe to do some research for a year. Of course Dr. Compton said he could have $5,000; he, the president, would take it from some special funds which he had available. So the vice-president and the dean involved got carbon copies of a letter to the professor saying he could invite his friend, and the $5,000 would come from this special fund. Well, of course, you understand that this special fund, like all other special funds, was what the Budget Committee had used to balance the budget. But good deans and vice-presidents always back up the chief, of course, and the professor got his $5,000, the dean got high blood pressure, and, not having any blood pressure, Jim Killian got an unbalanced budget. Of course, you know the pay-off on this story, gentlemen; the European importee turned out to make the most exciting discovery of the year from that particular laboratory, and Dr. Compton's generous $5,000 turned out to be one of our best investments of the year. This I consider to be the basic phenomenon behind Dr. Compton's greatness, and one of the major contributions he has made to the greatness of M.I.T.

. . . not having any blood pressure

Let me read from an article in the New York *Times* of Sunday, October 17, entitled "Top Man in Science." The top man, of course, was Dr. Compton. The quotation I want to give you is: "As President of M.I.T. he has built the institution from a rather conservative place, as far as experimenting is concerned, to the world's greatest research-engineering-teaching center." Now I don't believe everything I read in the papers, but I do believe that, and it wasn't written by an Institute Alumnus, either. Or at least I don't think it was, although the most amazing people do turn out to be, sometimes.

I wonder how many of you have seen Dr. Compton thoroughly angry. I have, at least three times. He has a typical reaction. I have seen him when he received a letter, usually from Washington, which would make any ordinary man grind his teeth, tear out his hair, stamp on the floor, wave his arms, and push his blood pressure up to 360/150. Instead, Dr. Compton looks very complacent; then he smiles, taps the arm of his chair, says "all right," and gets up and walks away. Gentlemen, you can't tell me that you are going to let a man like that down for a mere $20,000,000.

Now, who else can I tell you about? Oh, yes, there's Jim Killian, and I must hurry up to tell you about him while I still can. I have known Jim for nearly 19 years, but within a few months, after the coronation ceremonies in April, I won't be able to tell him what I think of him anymore, or at least he won't be able to believe it. I have known Jim ever since he was the editor of The Review, and I was an underpaid contributor to that valued sheet.

Some of us have worried for a long time over who could be found, when the time came, to fill Dr. Compton's shoes. Since no one *could* fill them, it is very fortunate for Technology that he is going to fill them himself. In the meantime, Jim Killian has been fashioning a pair of shoes of his own, and they are big shoes. I don't know of any other institution in the world that can look forward to being run by two such big men in two such big pairs of shoes, which can always be counted on to keep in step. That combination alone is worth more than this $20,000,000 to any institution lucky enough to possess it.

There are two amazing things about Jim as president of M.I.T. First, he is going into the job with his eyes open. Usually the job of catching a president is

difficult but possible if the right technique is used. You go a long way away and find somebody who doesn't know much about the place, and whom the Faculty doesn't know. Then you import him and spring him on the Faculty, who are always willing to give someone they don't know anything about the benefit of the doubt for at least one week. You promise the president all the money in the world to spend, without telling him that he has to raise it himself, and then, like the fraternity rushee who gets his suitcase carried from the station before initiation, but afterwards has to carry everybody else's suitcases, he, the president, finds himself carrying the whole place. But Jim has been carrying suitcases around here for a long time; he has strong shoulders, and seems to like it, so you have the doubly remarkable phenomenon of a president who knows in advance what he is up against, and one who has had his Faculty wholeheartedly with him many years in advance of his actual initiation.

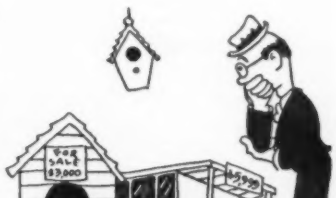
I can't give you a real story on everybody at the Institute, of course, but I must tell you what I really think of Horace Ford. Most fiscal officials of universities get along with the Faculty, according to my experience, with a mutual attitude which can be described politely as armed neutrality. I remember the treasurer of an institution with which I was once connected whose chief contact with the Faculty was through a remark he was said to have made to this effect: "Oh, Professors is cheap." Another fiscal official of the same institution got tangled in my hair over something, the details of which I have forgotten, and the only way I could relieve my feelings was by writing a Limerick about him. I don't remember any of the Limerick except the last four words, which were "that vicious officious official."

Now Uncle Horace can say "no," and make you just love him. I tried to borrow $3,000 from the Institute for down payment on a house soon after I came here; such practice is customary in many universities. Dr. Compton, of course, said, "yes." Uncle Horace gently said, "no." He explained that the Institute would like to help in housing its Faculty but since it had no campus of its own, the making of such a loan did not seem good policy. I went on renting my house, and two years later its price came down $3,000 and I bought it without any down payment, so I didn't owe anybody anything, except Uncle Horace for some good advice. I know I speak for hundreds of others when I say, "Blessed be the name of Horace, and may his endowment increase logarithmically."

Now I come to my fellow deans. You heard a number of them yesterday, so you can size them up for yourselves. This is a very close-knit group. Of course, we have to have working arrangements. I was a trifle perturbed yesterday by a bit of the imagery in which my colleagues indulged; when John Burchard was talking about the Institute's need for a Faculty Club I understood his insistence that there be facilities for the executive vice-president of the Alumni Association to play dominoes; I find that easy to visualize. But when Burchard set forth the cultural advantages of such a Faculty Club, that was another matter. I was intrigued by his remark that scholarly dignitaries visiting the Institute could be compared to comets. I must confess, however, that I was stopped by the picture of all the students lined up on Massachusetts Avenue with whisk brooms in their hands, brushing off the tails of visiting intellectual comets as they filed by. Then Dean Wurster and I don't always agree as to whether the old State, War and Navy Building in Washington is a beautiful building or not. So we have a working agreement; he takes care of the architraves, and I take care of the atoms and molecules, and we both admire each other very much. At least I do.

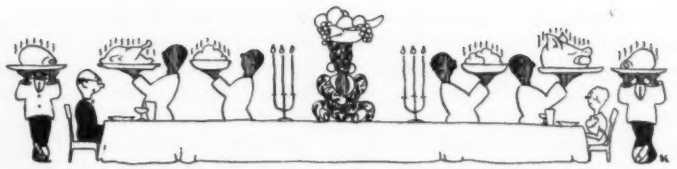
Then there is the Faculty. From the statistical data in Horace Ford's "Bible" that was handed out yesterday, I noticed that there has been, in recent years, a singular rough parallelism between the number of people on the Faculty, and the annual tuition. Two hundred Faculty members for $200; 700 Faculty members for $700. Of course the value of a professor cannot be determined from these figures but don't forget for a minute that those Faculty members have been preselected, specially combed, and attracted to the Institute by what the Institute had to offer. I don't mean just money, although professors' salaries are important. I mean the four things every professor wants and is going to get if he can: economic stability for his family; a plentiful supply of able students to attract to his profession; the provision of adequate surroundings and support to carry on scholarly work in his professional field; and the direction of an administration which is sympathetic and co-operative. Part of my job is to sell professors in the sciences (who are now in other colleges) and prospective department heads, on the fact that M.I.T. has all these things to offer in profusion. At times in the past it has taken quite a lot of showing; now there is so much obvious material to use in the selling job that it becomes a positive pleasure.

Our salary scale is now such as to put M.I.T. in a good over-all competitive position, though it must be raised further before we can consider ourselves in equilibrium again after the postwar readjustment. On an absolute basis, professors, as a class, have fallen considerably in scale of living, even relative to the rest of the upper middle classes. Three thousand dollars was a good salary for a professor in 1907, and he could build a very fine house for this. After World War I the dollar had shrunk to about $0.50, and $6,000 was his typical salary, while he could buy a house for $15,000 if lucky. Thus his purchasing power for houses had been cut to less than half, and whereas the 1907 professor could and did go to Europe fairly often in the summertime, by 1925 he was doing so much less frequently; now he can never go at all unless someone pays his way. The $6,000 salary has climbed a trifle, but the house has climbed a great deal more, and while it may settle down somewhere around $25,000, or eight times what it cost in 1907, there is little likelihood of the profes-



. . . he could buy a house

sor's salary reaching this. Nevertheless, we must aim to restore, as far as possible, the surroundings that make the scholarly life attractive to the Faculty.



Salaries free from tax . . . plus free housing, travel, expenses, servants

But salary is far from the main thing. Our sister institutions in South America have been laying at the feet of some of our professors offers of what must appear to them as the riches of Samarkand. Salaries of $15,000, free from income tax from any source whatever, plus free housing, travel expenses, and servants. Imagine having your wife able to keep a maid again! But our boys haven't fallen for the bait, even though careful calculations indicate that the equivalent salary, in good U.S. dollars which could be brought back to this country, is over $20,000 per year. What's wrong? Students; you couldn't be sure that they had had the proper training and selection to make them capable of climbing the scholarly heights reached at a place like M.I.T., and there *is* no place like M.I.T.

Why is M.I.T. unique? It is because we are not trying to do too much with the facilities available. M.I.T. is no longer merely an engineering school, even though in 1930 it was the best engineering school in the world, and still is. It is one-fifth of a university with a $300,000,000 endowment, and no other university has half this endowment. The nonexistent four-fifths consists of a medical school which we do not possess, a theological seminary and school of education which have failed to materialize, a law school which has not been founded, and sundry assorted departments of anthropology, zoology, Greek, comparative anatomy, and so on, for which we have not yet felt the need. Do not misunderstand me; these are all very desirable portions of a university, but they do not happen to be those portions for which we have accepted responsibility. The result is that though we lack the $240,000,000 endowment which we do not have, we do not miss it; we run our remaining fifth of a university on a bountiful $60,000,000 instead of the usual $20,000,000 or so which are the just share of the schools of science, engineering, and architecture, and the division of humanities, in most universities. This specialization marks the great uniqueness of opportunity of M.I.T., and it is a uniqueness which must not be sacrificed. When you bring in that $20,000,000, remember the remainder of the $100,000,000 you are not asked to worry about, because M.I.T. has known enough never to bite off more than it can chew.

What is an Institute of Technology? I say it is a specialized university set up to contribute as much as posssible, by the training of students and by scholarly output, to the technological needs of society. To achieve this, it is now generally recognized, requires a proper integration of engineering, applied science, and fundamental science. The last two were what were, to a considerable degree, lacking here before 1930. We don't have this perfect integration here even yet, but we are rapidly approaching it. My own feeling is that the integration between engineering and applied science is at present slightly overdone, and that the integration between applied science and fundamental science is not yet sufficient. Many of the items which are projected for the M.I.T. of the future are there to assist in arriving at what appears to be the most desirable point of balance in our operations.

Before 1930, a fundamental scientist who came to M.I.T. was considered by many of his colleagues to have deserted his cause, and gone over to practicality. The engineering departments at M.I.T. were outstanding, but the science departments were subservient, consisting mainly of Faculty members whose function was training engineers in science. Now our science Faculty has been built up in the direction, not only of giving a broad fundamental training to would-be engineers but to scientists as well; our science department also offers a broad professional training in the sciences, particularly in the important postgraduate years of study.

There are many reasons why M.I.T. should have the five best science departments in the country. I can produce five men, many of them department heads, who would claim that we already do. An estimate which I have attempted to keep dispassionate would lead me, however, to estimate that at present we rank, on an average, second. Second to whom? Quite definitely, second to no individual institution. But in one science department we may rank second to the University of Chicago; in another, to the University of California, and so on. It is, of course, somewhat meaningless to ask which is the best department of chemistry or mathematics or physics in the country at any particular time, but one will get quite consistent results if one asks which are the strongest five departments in any particular field, and fairly consistent results are obtained if one asks for the first three. So I have attempted to size up our science departments in terms of win, place, or show. Giving three points to first, two to second, and one for third, I come to the conclusion that, in terms of scholarly reputation, we surely deserve at least nine points out of a possible 15. This is a good showing, when you realize that a school having the fourth best department in the country in each of the five basic scientific fields would rate zero. But I shall not rest satisfied for Technology until the figure comes closer to 15, because M.I.T. has the need for and the opportunity to have the five outstanding scientific departments of the country.

Why the need? At this date I don't think I need argue the point that a great Institute of Technology must contain a great school of science. No one now denies that the best engineers are those with the broadest fundamental training in science, on which has been superposed suitable professional training. It is becoming increasingly obvious, especially as a result of World War II, that a fine technology results from a close association of scientists and engineers. Engineers are supposed to be fundamentally conservative, while scientists need to be fundamentally radical to do their best work, but each needs tempering by the characteristics of the other.

(*Continued on page 190*)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Council Counsel

JOHN A. LUNN, '17, Vice-president of the Alumni Association, presided at the 265th meeting of the M.I.T. Alumni Council held on November 29, when C. George Dandrow, '22, President, was unavoidably absent. Business with which the 122 members concerned themselves included approval of the minutes of the previous meeting, introduction of three guests – John A. Harvey and Douglas M. Van Patter, graduate students from Canada, and Richard F. Sundstrom, '31, of Stockholm – and change of class affiliation for four Alumni. It was also reported that three Faculty members had visited eight M.I.T. clubs between October 14 and November 18; that the December Council meeting would be omitted; and that the Midwinter Meeting of the Alumni Association would be held at Walker Memorial on February 5.

Malcolm G. Kispert, 2–44, Administrative Assistant to the President, presented a résumé of some recent developments at the Institute. He outlined the activities of the successful two-day meeting at the Institute on November 19 and 20 when the Financing Development Program was officially opened. He also advised the Council members of plans for Eastgate, a large apartment building to be erected adjacent to the President's House, as recorded in greater detail on page 171. Mr. Kispert concluded his remarks by announcing that a study is under way of the salaries of faculty members of technical schools as compared with salaries in other professional schools.

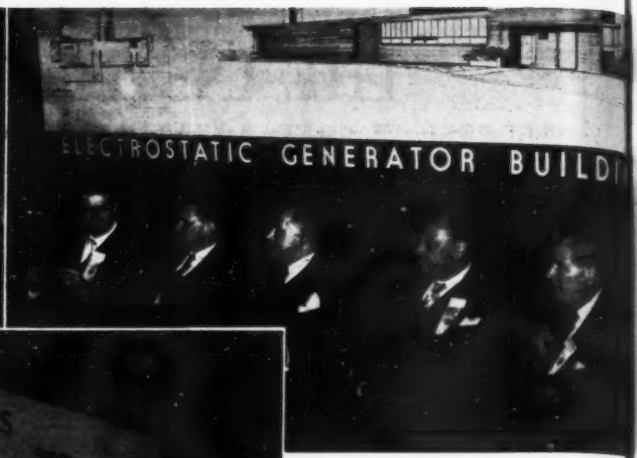
Professor John C. Slater, Head of the Department of Physics, was then called upon to introduce Philip M. Morse who has returned to the Institute as professor of physics, after having served as the administrative head of the Brookhaven National Laboratory.

In a talk, illustrated with slides, Professor Morse outlined the origin, history, and development of the Brookhaven National Laboratory. During the two years in which Dr. Morse was director, this much needed research Laboratory in atomic physics has been transferred from an Army camp to an operating research unit. Dr. Morse stressed problems which had been encountered in finding suitable living quarters for the research and administrative staff of Brookhaven, of providing necessary security while simultaneously adapting the Laboratory to research activities for almost a dozen educational institutions in the northeast part of the United States, the manner in which the staff was assembled, and safety measures and public relations activities which had been found necessary, or desirable, in order that the Laboratory might operate efficiently and have the good will of residents in neighboring communities.

Marshall B. Dalton, '15
General Chairman

Charged with the responsibility of raising $20,000,000 for additional endowment and new facilities for M.I.T., the Committee on Financing Development will have the leadership of two nationally known Alumni: Marshall B. Dalton, '15, President of the Boston Manufacturers Mutual Fire Insurance Company, and of the Mutual Boiler Insurance Company; and Alfred P. Sloan, Jr., '95, chairman of the Board of General Motors Corporation.

Alfred P. Sloan, Jr., '95
Honorary Chairman



300 MEMBERS OF THE COMMITTEE ON FINANCING DEVELOPMENT ATTEND FIRST MEETING AT M.I.T. ON NOVEMBER 19–20

M.I.T. Photos

As chronicled on page 110 of the December Review, Alumni and friends of the Institute gathered in Cambridge on November 19 and 20 to study the Institute's high priority postwar needs for buildings and endowments. Shown here are visual impressions of that meeting as caught by the camera. Upper left corner, left to right: *Rain made it inadvisable to hold the formal ceremonies dedicating the opening of the 12,000,000-volt electrostatic generator out of doors, so the plaque marking the new building was the center of attention in ceremonies held in Room 10–250 (Huntington Hall). At the ceremonies were: George R. Harrison, Dean of Science; Professor Jerrold R. Zacharias; Captain John G. Johns, James R. Killian, Jr., '26, President; Karl T. Compton, chairman of the Corporation; and Professor Herbert L. Beckwith, '26. The generator is part of the Laboratory for Nuclear Science and Engineering.* Upper right: *Speakers at the Saturday morning session included* (left to right): *Alexander Macomber, '07, member of the Committee on Foundations (speaking for Frank B. Jewett, '03, chairman, who could not be present); Joseph J. Snyder, 2–44, Assistant Treasurer of the Institute; Thomas D'A. Brophy, '16, chairman of the Committee on Public Information; H. B. Richmond, '14, chairman of the Committee on Alumni Participation; and Professor William L. Campbell, '15, chairman of the Committee on Projects.* Center: *John R. Macomber, '97, chairman of the Corporation's Survey Committee, concluded the Saturday luncheon with a brief statement outlining the work which is to be accomplished in the coming months by the 672 alumni members of the Financing Development Committee.* Lower left: *At the Saturday luncheon, those at the speaker's table included: Marshall B. Dalton, '15, general chairman of the Financing Development Committee; Karl T. Compton, chairman of the M.I.T. Corporation; Rear Admiral Lawrence B. Richardson, '21; Phillips Ketchum, chairman, Committee on Bequests; Captain John G. Johns, Office of Naval Research; George I. Chatfield, '28, member of the Committee on Public Information; and Thomas D. Cabot, member of the Steering Committee.* Lower right: *Speakers who opened the meeting, following the luncheon on November 19, and who spoke on the Institute's needs in various educational fields, included: Thomas K. Sherwood, '24, Dean of Engineering; Professor John C. Slater, Head of the Department of Physics; John E. Burchard, '23, Dean of Humanities; Horace S. Ford, Treasurer of M.I.T.; Everett M. Baker, Dean of Students; and Professor William L. Campbell, '15, Executive Director of the Financing Program.*

Eastgate: One Floor of Three

THE most unusual apartment building in America is to be erected at 100 Memorial Drive in Cambridge, adjoining the M.I.T. President's House. Thus did Dr. James R. Killian, Jr., '26, President of Technology, and George Willard Smith, President of the New England Mutual Life Insurance Company, announce the completion of two years of co-operative study by these two organizations leading to the beginning of construction on the site of the Shoe and Leather Exposition Building which has now been torn down.

Scale models of the entire project – one of which is shown below – and of several typical room layouts reveal an interesting plan with many novel and practical features which take fullest advantage of the attractive location and provide dwelling units with vistas more like country homes than city apartments. The site, with 430 feet of frontage on the colorful Charles River Basin, a short block from the Kendall Square subway station, provides a two and one-third acre tract of land which has been leased by M.I.T. to New England Mutual Life Insurance Company for 60 years. The insurance company will own and operate the apartment house during this period, at the end of which time it will become the property of M.I.T.

The design of Eastgate – as the new apartment building will be called – embodies a new conception of multiple dwellings. The 12-story building, provides a large living balcony, maximum ventilation and unsurpassed view for each apartment. There will be 261 dwellings units, consisting of studio, one-, two-, and three-bedroom apartments totaling approximately 1,000 rooms. Plans call for open, spacious rooms with large areas of glass, including a glass wall at the end of each living room looking out and across the balcony. Roominess and privacy are increased by the use of a new principle in elevator access, in which the elevators stop only at every third floor. On these floors, there are corridors with private stairways to each apartment on the floors immediately above and below. All apartments on the non-corridor floors are thus given maximum outside exposure, affording much more light, quietness, and through ventilation. Corridor-floor apartments, generally of the one-bedroom size, have all rooms overlooking the Charles River Basin and downtown Boston.

The main structure and its two wings are so placed as to take full advantage of sunlight and breezes and will also insure maximum privacy in the apartments. Generous gardens and play areas are provided by the open plan, and the lower lobby will contain space for stores for the convenience of tenants of the building. There will also be a connecting garage, with parking space both inside and on its roof.

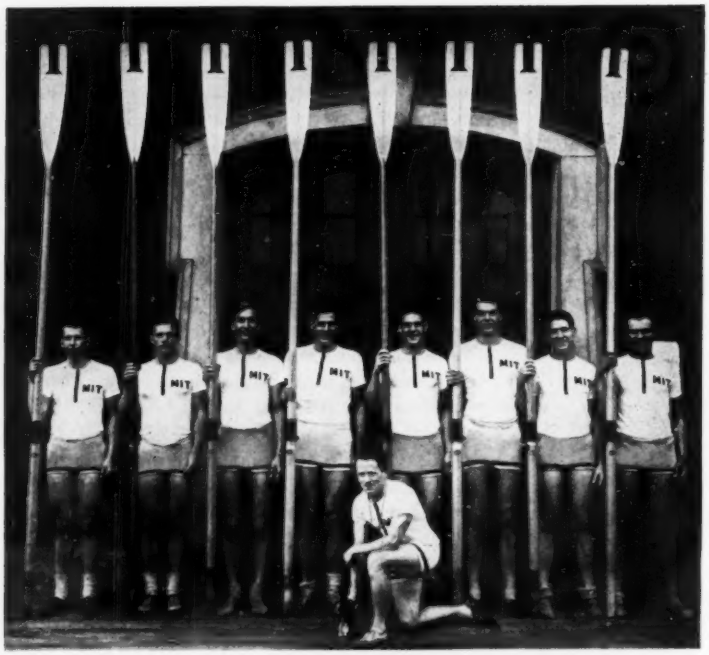
President Killian stated that he and his associates are entering into this project with enthusiasm, for it will mark a long step toward the solution of a problem in Faculty housing which has grown increasingly acute since World War II. "In recent years there has been a substantial expansion in our staff," he said, "with the result that most newcomers have had to go many miles from the Institute in order to find suitable accommodations for their families. We have felt it important that additional modern living facilities be provided near at hand for the convenience of the staff and to provide more community life as an integral part of an urban institution. This timely building project should now make our objective possible of realization."

First choice of rentals will be given to veterans, M.I.T. Faculty and staff, married students, and close associates. When the building nears completion, a more definite announcement will be made concerning apartments available to the public and the rents to be charged.

The architects – William H. Brown, '33, Associate Professor of Architecture, Robert W. Kennedy, Assistant Professor of Architecture, and Carl Koch, As-

M.I.T. Photo

Photograph of scale model of Eastgate shows only a few of the original features in the 12-story structure to rise on Memorial Drive, adjacent to the President's House. Each apartment looks into the open, across the Charles River Basin, and each has a maximum amount of sunlight. Corridors occur only on every third floor at which elevators stop. Apartments above and below corridor floors are reached through private stairways having entrance foyers on corridor floors.



At the Poughkeepsie Regatta last June, M.I.T.'s Varsity Crew finished fifth among the 11 intercollegiate crews which participated. Members of the Institute's Varsity Crew who rowed at this colorful annual event (left to right) *are: Robert L. Silberman, '48, Harald C. Bjerke, '49, Paul Gerhardt, 3d, '49, Francis L. Marran, '49, Andrew R. Pfeiffenberger, '49, Robert C. Weber, '50, Alvin D. Pendleton, '50, John J. Rudolf, Jr., G., William J. Grant, '48, coxswain. This year, James B. McMillin, head coach of Crew, will have only three men from the Poughkeepsie boat to form a nucleus for the 1949 varsity. They are Messrs. Pendleton, Weber, and Bjerke.*

The Junior Varsity Crew will fare somewhat better with five oarsmen returning, while the Freshman boatmen return this season as a unit practically intact. M.I.T.'s Freshman Crew, coached by Charles O. Jackson, Jr., won fourth-place honors in its division at Poughkeepsie last spring.

M.I.T. Photo

sistant Professor of Architecture, with consultants Professor Vernon DeMars and Ralph Rapson, Assistant Professor of Architecture – are all on the staff of M.I.T.'s School of Architecture. They have worked closely with Professor William W. Wurster, '17, Dean of Architecture and Planning at M.I.T., and with New England Mutual's architectural consultant, A. Osborne Willauer.

Filial Approval

EMULATION of paternal action was evidenced at the Institute last September when practically half a hundred students, whose fathers are Technology Alumni, registered in the Freshman Class. The growing list, of the last few years, of the father and son group in the first-year class would indicate that educational viewpoints and objectives, like Charity, often begin at home. But this group is not always limited to fathers and sons. At times, as this year, it includes fathers and daughters. Thus, with pleasure we note a representative of the distaff side – Miss Joan M. Fleckenstein of Ionia, Mich. – in the listing of freshmen and Alumni which follows:

Son	*Father*
John R. Camp	Thomas R. Camp, '25
Kenneth M. Childs, Jr.	Kenneth M. Childs, '17
William C. Church	Walter E. Church, '21
James A. Cook, Jr.	James A. Cook, '12
Edward L. Davis	Malcolm G. Davis, '25
Donald L. Dawes	Lyman M. Dawes, '23
Walter E. Dietz	Walter Dietz, '23
Alexander L. M. Dingee, Jr.	Alexander L. M. Dingee, '22
John A. Dixon	Frank E. Dixon, '06 (deceased)
James Dorsey	Farnum F. Dorsey, '01
Freeman H. Dyke, Jr.	Freeman H. Dyke, '20
Edward C. Facey	John A. Facey, '21
Joan M. Fleckenstein	Jackson G. Fleckenstein, '19
Michael E. Green	Harry Green, '23
Oliver E. Hall	Oliver C. Hall, '14
John B. Hampshire	Benjamin F. Hampshire, '25
Douglas F. G. Haven	Franklin K. Haven, '23
Richard M. Hill	Warren E. Hill, '24
Richard F. Jenney	Melvin R. Jenney, '21
Harry F. King	Maxon H. King, '25
Conrad D. Kohler	Carl J. Kohler, '28
Richard F. Lacey	Henry R. Lacey, '18
William H. Lane	Frederic A. Lane, '18
Robert M. Lurie	Joseph M. Lurie, '21
John P. Lynch	John P. Lynch, '20
Gilbert B. N. Mar	Pellian Teh Chi Mar, '15
John B. Mattson, Jr.	John B. Mattson, '21
Dana W. Mayo	Dana H. N. Mayo, '14
Eugene Mirabelli, Jr.	Eugene Mirabelli, '19
William H. Mueser, Jr.	William H. Mueser, '22
Frank J. O'Neil	Frank D. O'Neil, '25
Robert H. Osborn	Franklin Osborn, 2d., '11
Brian P. Parker	Milton E. Parker, '23
Charles L. Proctor	Harold E. Proctor, '17
Bruce D. Replogle	Delbert E. Replogle, '24
John D. Robertson, Jr.	John D. Robertson, '16
Frank G. Shanklin	Dunbar L. Shanklin, '23
Paul H. Skogstad	Herbert W. Skogstad, '19 (deceased)
Donald J. Sontag	Herbert P. Sontag, '25
George W. Stetson, 3d.	George W. Stetson, Jr., '25
James I. Stockwell	Ernest F. Stockwell, '22
Robert H. Sturdy	William W. Sturdy, '24
John A. Sullivan	John W. W. Sullivan, '23
Theodore Taylor, Jr.	Theodore Taylor, '26
Arthur S. Turner	Stanley H. Turner, '24
William H. Vogt, 3d.	William H. Vogt, Jr., '19
Paul G. Wetherbee	George B. Wetherbee, '21
Christopher Winsor	Paul W. Winsor, Jr., '22
Sarkis M. Zartarian, Jr.	Sarkis M. Zartarian, '24

(*Continued on page 174*)

To our Colleagues in American Business . . .

Here is another example of the fact that the cost of material per pound is not so significant as the cost of the finished part or product made out of it. In fact, judging material costs on a cents-per-pound basis may be completely misleading.

Revere during the war was asked by the government to apply its long experience with copper and brass to the manufacture of mill products in aluminum. It has remained in the aluminum business, making tubing, extruded shapes, and forgings. The latter naturally are custom-made to special designs. One of these seemed interesting to us, and the customer was asked if he would care to provide facts and figures that would show why he found it economical to choose an aluminum forging for this machine part.

He told us that he originally made this out of cast iron, which is, of course, an inexpensive material. An aluminum forging naturally costs more than an iron casting, in this case 5.2% extra. That would seem to be a big handicap to overcome, but a number of important savings when totaled together showed that this "costly" forging was actually saving considerable sums.

For example, the iron casting was ⅛ inch oversize on top and bottom, to allow for machining; the aluminum forging is so accurate to dimensions that only 1/32 inch is allowed for machining. This means 75% less stock is removed when machining the two faces.

Machining cost is 75% less than on the iron casting, this figure including a loss of 10% of the castings due to defects uncovered by machining. Since the forging is dense and uniform, free from porosities, it is unnecessary to pressure-test it to make certain of its quality. This pressure test of the casting was an expensive process in terms of labor costs and time consumed. Doing away with it not only reduced costs but speeded up production. When all the figures were in, it was found that this forging which was 5.2% more expensive actually cost 35.4% less as a finished part. And it was a better part, too, in every way.

If you are making or buying castings, Revere suggests that you investigate forgings. They have many structural advantages, and, as this example shows, may also offer economies. In fact, no matter what you make or buy, Revere recommends that you disregard the initial cost of materials. It may very well be that a more expensive material is less costly in the end and will not only save money but improve your product's appeal to your market. One final thought — suppliers to every industry will be delighted to collaborate with you in your studies of this subject. Why not call them in and add their knowledge to your own?

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THE INSTITUTE GAZETTE

(*Continued from page 172*)

Chemistry and Sociology

ROBERT E. WILSON, '16, chairman of the Board of Standard Oil Company of Indiana, was the first chemist, the first industrialist, and the first Technology Alumnus to deliver an Arthur Dehon Little Memorial Lecture when he spoke in Walker Memorial on November 23. It might be added, that he was also the first member of the Corporation to have this distinction.

Drawing on his wide experience in chemistry and chemical engineering in industry, in universities, and in government service, Dr. Wilson was admirably qualified to speak on "Research on a Single Reaction and Its Social Effects." In his address, Dr. Wilson pointed out that life in America is what it is today largely as a result of research on a single chemical reaction – the cracking reaction that breaks large hydrocarbon molecules into smaller ones so that the useful supply from gasoline reserves has been more than doubled.

The tremendous significance of the cracking process was vividly brought out by considering that automobiles, trucks, tractors, and airplanes have given the American public freedom of mobility such as mankind had never previously dreamed of. The use of such vehicles could never have been expanded to anything like today's quantities and tempos without the doubling or trebling of the gasoline supply that cracking made possible.

Established in 1944 with funds donated by Arthur D. Little, Inc., it is the purpose of these Memorial Lectures to record the deepest thoughts and convictions of the lecturers, based on many years of experience in their contacts with science, society, government, economics, and the humanities. The first Arthur Dehon Little Memorial Lecture was given two years ago by Sir Edward V. Appleton; last year it was given by J. Robert Oppenheimer.

Increment

AN increase in tuition of $100 at M.I.T., to take effect with the opening of the fall term in 1949, will bring the Institute's comprehensive tuition, including all fees, to $800 for an academic year.

The 15 per cent increase in tuition will be accompanied by a 30 per cent increase in scholarship aid and by a still further liberalizing of student loans. Loans up to a total of $250,000 a year can be made to qualified applicants out of the Institute's revolving Loan Fund, the largest in any American college. In announcing the increased tuition, President Killian said:

Since 1939–1940 the Institute's operating expenses have risen more than 60 per cent and they are still rising. The over-all increase in tuition since that time, including the new increase, amounts to approximately 33 per cent and thus goes only part way toward meeting the higher costs. A recent survey of college fees showed that a representative list of endowed institutions has reported increases averaging 52 per cent since 1939–1940. The Institute's

(*Continued on page 176*)

Fay Photo

Shown above are 57 of the 94 members of the Class of 1898 who were present at their 50th reunion celebration which was held last June at The Country Club in Brookline. First row, left to right: *Reginald S. Tobey, George W. Treat, Roger W. Babson, Fred B. Cutter, George T. Cottle, Lester D. Gardner, Charles S. Hurter, Elliott R. Barker, Frank B. Perry, Ernest F. Russ, Edward S. Chapin, William R. Strickland, Lamont Rich, John S. Bleecker, Van Rensselaer Lansingh, and David C. Fenner.* Second row, left to right: *Fred H. Twombly, Carl S. High, Clarence Goldsmith, Ralph T. Horton, Robert M. Vining, Robert S. Allyn, Shirley S. Philbrick, Maurice F. Delano, Benson B. Priest, Robert M. Draper, Henry C. Belcher, Paul B. Wesson, Arthur A. Blanchard, Willis L. Learned, Albert W. Tucker, Frank F. Colcord, and Ernest A. Bragg.* Third row, left to right: *William Brewster, Edgar A. Weimer, Willard B. Nelson, Karl W. Waterson, Heber A. Hopkins, Walter A. Cleaveland, Lyman F. Hewins, Simon Fleisher, Ray C. Faught, Henry F. Scott, Frederic M. Kendall, David H. Blossom, Joseph C. Riley, and Ernest Woelfel.* Fourth row, left to right: *Edward N. Milliken, Rudolph Tietig, Julius E. Nolte, Walter H. Lee, Milan V. Ayres, Fred B. Dawes, Albion W. Shaw, Edmund C. Little, Howard L. Bodwell, and Alvan L. Davis.*

New Home Office Building, North American Life and Casualty Company, Minneapolis, Minn.
Architects – Lang and Raugland; Associate Architects – Johnson and Backstrom;
General Contractors – Pearson Brothers; Heating Contractor – F. S. Lamson Company

When Steam Was Turned On In Minneapolis

Steam was turned on this fall under Webster Moderator Control in the new Home Office Building of North American Life and Casualty Company.

Growth through service, which for 52 years has been the basis for North American's expansion and progress, was also the basis for the selection of the mechanical equipment in this modern building.

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THE INSTITUTE GAZETTE

(*Continued from page 174*)

percentage increase in tuition is thus less than the average, despite the fact that scientific and engineering education is more expensive because of the extensive laboratories and elaborate equipment required. M.I.T. continues its long-standing policy of having a single comprehensive tuition which includes the fees that are usually additional charges, such as athletic, medical, matriculation, and diploma fees.

Except for increasing scholarship funds, we shall apply the additional income to cover necessary increases in salaries and wages which have already been given to enable our personnel to meet rises in the cost of living, and to enable M.I.T. to maintain an outstanding Faculty. Without the increase in tuition the Institute would be faced with a dangerously large deficit. Even with the increase in tuition the student will be paying only a fraction of the cost of his education, the rest being met by income from endowment and other sources.

In recent years we have received many additions to our scholarship funds by gifts and bequests, and these funds, supplemented by a special allotment from the increased fees, and the Technology Loan Fund will meet any increased needs for student aid resulting from the higher tuition. The number of available scholarship awards will be increased by about 30 per cent, and the average amount per award will be increased by the same amount. In no year since 1941 has the demand for new loans from the Technology Loan Fund exceeded $50,000. The Fund is now in a position to care for the needs of all qualified applicants up to a total of $250,000 per year. On January 1, 1949, the 2 per cent interest rate will be decreased to 1 per cent on all outstanding loans as well as on new loans. Wherever possible, the Institute will seek increases in fellowship stipends to cover the increase in tuition.

In his announcement Dr. Killian spoke also of the Administration's determination to adhere to the ideal of continually maintaining M.I.T. as one of the independent institutions in a position of leadership in engineering, science, and architecture. He emphasized the importance of this ideal in view of trends which threaten the independence of endowed institutions. "It is becoming increasingly important," Dr. Killian said, "that a certain number of private and independent educational institutions should maintain positions of unquestioned leadership, and thus set standards of achievement and freedom for all higher education."

Midwinter Boston Meeting

SATURDAY, February 5, is the date set for the Midwinter Meeting of the M.I.T. Alumni Association, at which Karl T. Compton, chairman of the M.I.T. Corporation, and James R. Killian, Jr., '26, President, will speak on recent developments at the Institute. Professor Robley D. Evans of the Department of Physics will discuss the latest research work in medical and related fields which has been made possible by new techniques with high-voltage equipment and in the field of atomic energy.

Prior to the evening talks, a cafeteria-style dinner will be served in Morss Hall of Walker Memorial, with tables arranged according to classes.

(*Continued on page 178*)

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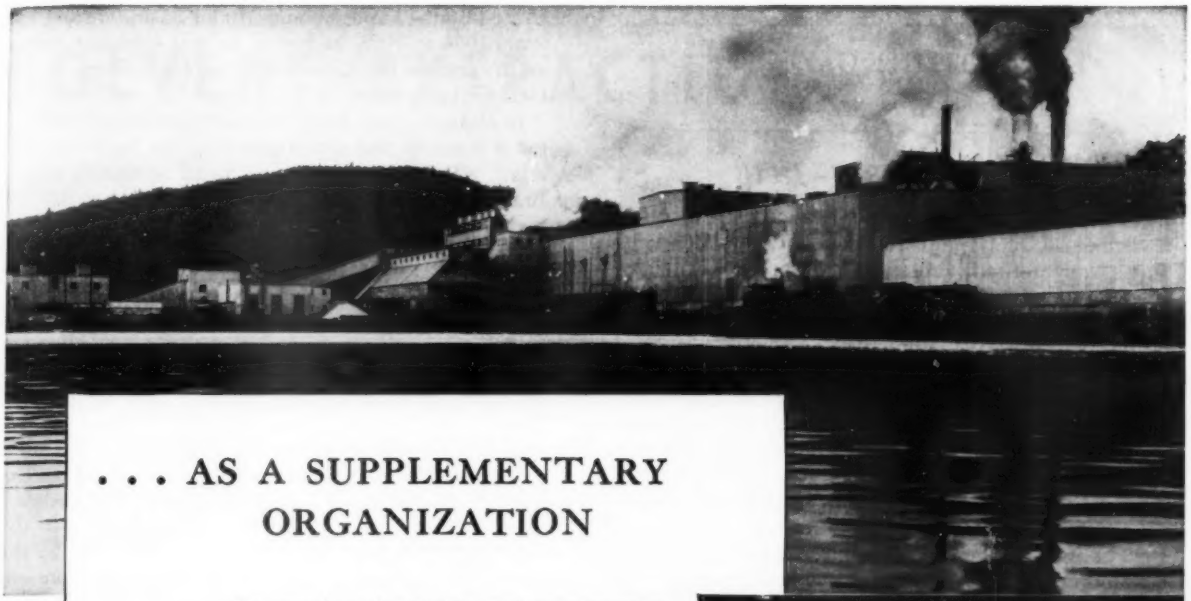

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To expedite the design and construction of a Pulp Mill for Marathon Paper Mills of Canada, Ltd., Stone & Webster Engineering Corporation established a supplementary organization of engineers, specialists and draftsmen to act as part of the client's own engineering department. The Engineering Corporation also furnished consulting advice on special phases of the project and supervised all the construction.

The Bleached Sulphate Pulp Mill of Marathon Paper Mills of Canada, Ltd., located at Marathon, Ontario, on the North Shore of Lake Superior.

Above: Power and Recovery Boiler Room. Left: Machine Room — Dry End.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

THE INSTITUTE GAZETTE

(*Continued from page 176*)

Lybrand P. Smith: 1891–1948

IT is with regret that we announce the death, on November 25, of Captain Lybrand P. Smith, United States Navy (retired), Professor Emeritus of Naval Engineering in the Department of Naval Architecture and Marine Engineering. Captain Smith served in the Department from 1945 until 1947.

A native of Decatur, Ill., where he was born in 1891, Captain Smith was awarded the degree of doctor of science by American University in 1935. His long and distinguished career with the Navy began in 1911 upon his graduation from the U.S. Naval Academy.

From 1919–1921 Captain Smith held various cabinet posts in the Dominican Republic. From 1921 to 1923 he was commercial superintendent of the Naval Communication Service. He then became senior assistant engineer and later chief engineer of the *U.S.S. Colorado*. After two years with the repair division of the Bureau of Engineering from 1926 to 1928, Captain Smith became commanding officer of the *U.S.S. Zeilin* and then of the *U.S.S. Claxton*, thereafter serving successively as officer in charge of the United States Naval Boiler Laboratory; of the Boiler Desk in the Design Division of the Bureau of Engineering; and of the Propeller Desk, with additional duty for research at the United States Experimental Model Basin. During the years 1936 to 1938, inclusive, he was engineer officer on the staff of the Commander of Battleships, of the United States Fleet.

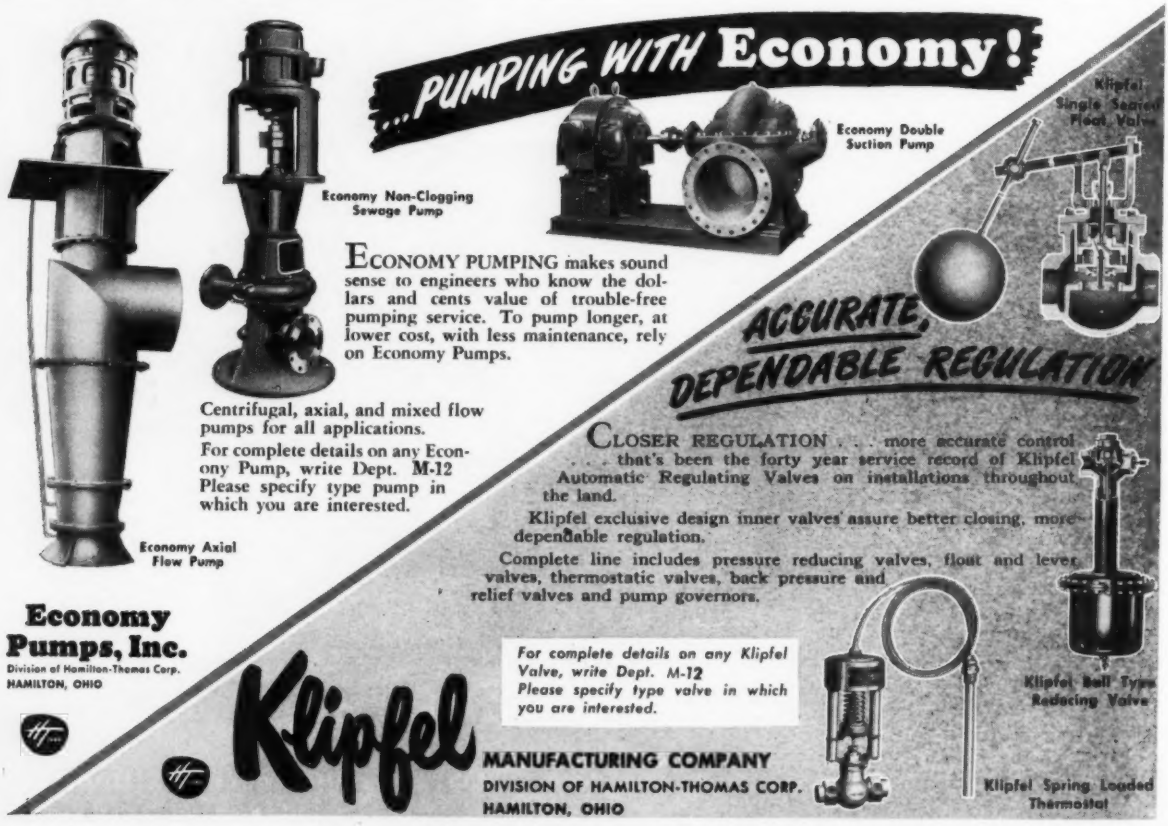
In 1941, Captain Smith became assistant co-ordinator of research and development of the Navy Department, after having served as head of the Research Branch of the Bureau of Ships. He represented the Navy on the National Defense Research Committee until he was released from active duty in 1945, following retirement for physical disability incurred in the line of duty. In 1946 Captain Smith was awarded the Legion of Merit.

Civil and Sanitary Laboratory Status

WELL attended meetings of the Visiting Committee on the Department of Civil and Sanitary Engineering* were held at the Institute on December 1 and 2, 1947. A luncheon in the Campus Room of the Graduate House on December 2 was attended by the staff of the Department, the members of the Committee, Vice-president James R. Killian, Jr., '26, Executive Vice-president Edward L. Moreland, '07, Dean Thomas K. Sherwood, '24, and Robert M. Kimball, '33, Administrative Assistant to President Compton.

(*Continued on page 180*)

* Members of this Committee for 1947–1948 were: Thomas C. Desmond, '09, chairman, Allan R. Cullimore, '07, Richard H. Gould, '11, Harold Bugbee, '20, H. W. McCurdy, '22, Thomas F. Farrell, and Beauchamp E. Smith.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SOLVENT EXTRACTION *by* Vulcan

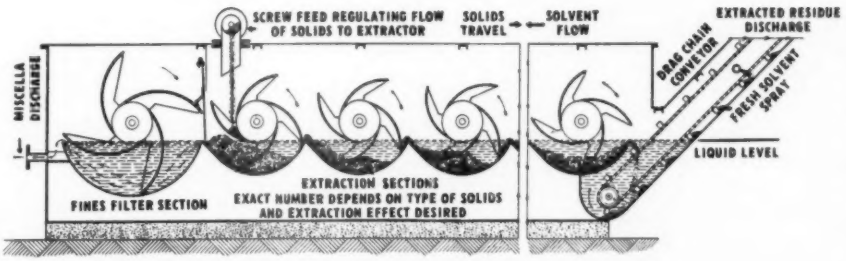
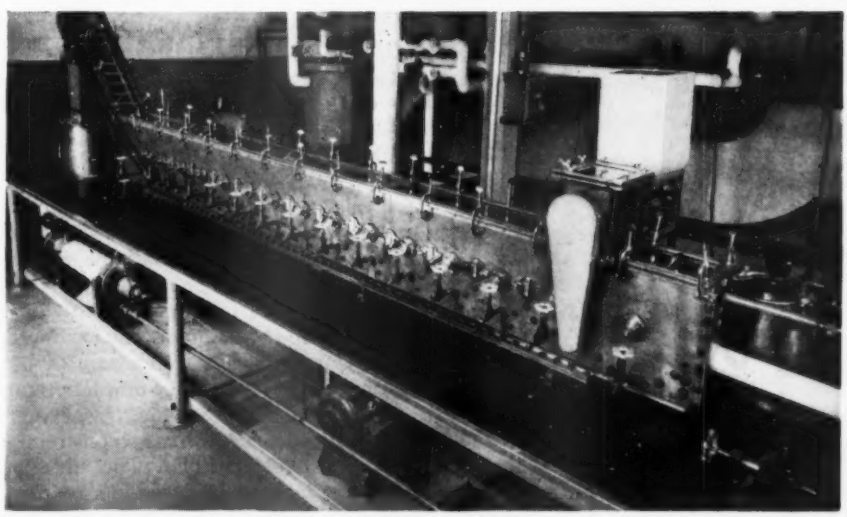


Diagram of the "Kennedy" Patented Continuous Solvent Extraction System.



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THE INSTITUTE GAZETTE

(*Continued from page 178*)

During the past year, the undergraduate enrollment in Civil Engineering has increased by 16.3 per cent, as compared to an increase of 9.5 per cent for the total enrollment of the Institute. This is especially gratifying since the decline of undergraduate enrollment in Civil Engineering prior to World War II created one of the major problems of the Department. During the past year the graduate enrollment in the Department declined 17.1 per cent. This decline, however, was due entirely to the manner in which admissions to the Graduate School were administered. Graduate students in Civil Engineering are limited to 50 by quota. Last year the quota was exceeded. This year it was strictly observed. The number of qualified applicants greatly exceeded the number admitted.

A sharp increase in sponsored research conducted by the Department, including both grants-in-aid of research and contracts under the Division of Industrial Coöperation, was noted. In 1945–1946 there were no contracts, but the value of such work was $30,557 in 1946–1947, and $113,170 in 1947–1948. The current research projects are diversified in nature and are divided between the divisions of the Department as follows: Structural Engineering, $27,600; Soil Mechanics, $23,957; Hydraulic Engineering, $41,300; Sanitary Engineering, $20,313.

The Committee is much interested in the reaction to the new undergraduate curriculum in Civil Engineering, which has just been put into operation. It is too soon to reach any conclusions as to how it will work out, but such information as is available indicates that it is being well received.

The new Hydrodynamics Laboratory continues to be the major need of the Department. The Committee realizes that the Corporation is well aware of both the importance and the urgency of the new laboratory, and that steps have already been taken that have provided part of the funds needed for its construction. Since our report of last year, detailed plans and specifications for the new laboratory have been prepared. Largely because of increases in construction costs during the past year, the estimated cost of the laboratory is now substantially greater than had originally been anticipated. In collaboration with the Department, the architects are now engaged in a study to eliminate certain features of the proposed laboratory, in an effort to reduce its estimated cost. The excellent work now being conducted under the direction of Professor Arthur T. Ippen, with the limited facilities available to him in the present temporary Hydraulics Laboratory, and the fact that he is faced with the probable necessity of declining to accept a number of desirable research projects because of present space limitations, are strong indications of the need of the new laboratory. We can only recommend that the Institute continue its campaign to obtain the required funds.

The Committee is much interested in the investigations dealing with the effect of impulsive loadings on

(*Continued on page 182*)

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THE INSTITUTE GAZETTE

(Continued from page 180)

reinforced concrete beams, being conducted in the new Structural Dynamics Laboratory by Robert J. Hansen, Assistant Professor of Structural Engineering, and is pleased to learn that the Concrete Laboratory will be developed next year under his direction. For several years the Committee has urged the resumption of research in this field by the Department.

Research in the Structural Analysis Laboratory is severely handicapped by the lack of loading devices that would permit the testing of medium-sized steel models. Charles H. Norris, '31, Associate Professor of Structural Engineering, who is in charge of this laboratory, has suggested the construction of a universal loading frame, which would go far toward meeting this deficiency. We urge the construction of such a frame which would cost approximately $10,000.

Herman J. Shea, '33, Associate Professor of Surveying, who is in charge of instruction in this field, presented the Committee with a report dealing with a proposal to complete the equipping of the Photogrammetry Laboratory at an estimated cost of $6,225. The Committee was impressed by the need of completing this laboratory, and is delighted to learn that since its meeting, funds have been made available for this purpose through a special gift.

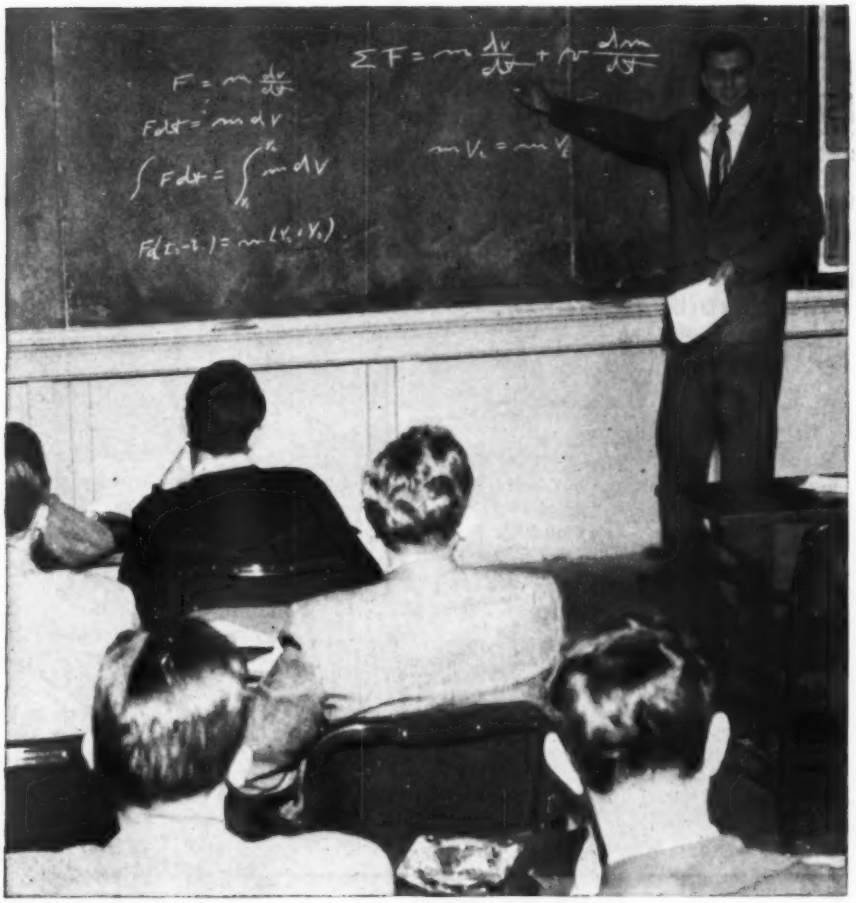
The William Thompson Sedgwick Laboratories of Sanitary Science, which were dedicated on December 3, 1947, were inspected by the Committee on December 1. These fine laboratories, which have been developed during the term of service of the senior members of the Committee, are a fitting tribute to the man for whom they are named. The research program now being carried out under the direction of Clair N. Sawyer, Associate Professor of Sanitary Chemistry, is indicative of the contribution that these laboratories will make to the Institute's program, but for more complete development of research in Sanitary Engineering, consideration should be given to the construction and operation of a pilot-type experiment station for the study of certain problems and the accumulation of basic data relating to the economic treatment of sewage and industrial wastes.

The soil solidification research project being conducted in the Soil Mechanics Laboratory under Donald W. Taylor, '34, Associate Professor of Soil Mechanics, is of interest, and particularly so because it brings the Civil Engineering Department into close contact with the Department of Chemical Engineering in studying the application of colloidal phenomena to soil problems.

The Committee could not help noting the need for repainting and for improved lighting in many of the corridors, offices, drafting rooms, and classrooms of the Civil Engineering Department. It is to be hoped that these conditions can be remedied.

In conclusion, the Committee is pleased to report that the past year has been one of constructive progress in the Department. Some of the plans in which the

(Concluded on page 184)



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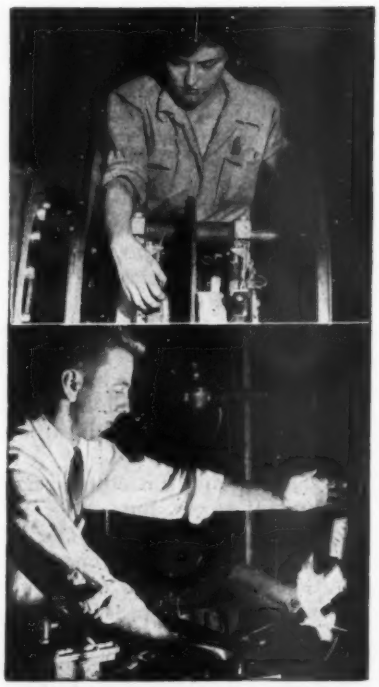

To graduate engineers, including women, General Electric offers further study in its "Test" Course, in its A, B, and C Courses of increasing specialization in engineering problems, or in its Sales Engineering Program. Business administration and liberal arts students study the broad list of subjects provided by the Business Training Course. There are other courses for advertising recruits, chemists, stenographers. Young people without college degrees may enroll in the company's Apprentice Training Program, offering training in subjects ranging from blueprint reading to applied metallurgy. All in all during 1948, the company provided free instruction in 96 courses, taught by more than 500 instructors. Total enrollments numbered 21,482. By developing new skills and new talents, G-E employees improve their jobs and increase their contributions to the quality of General Electric products.

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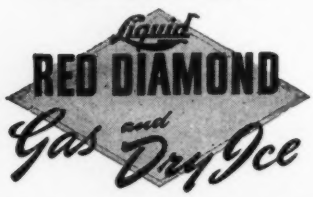

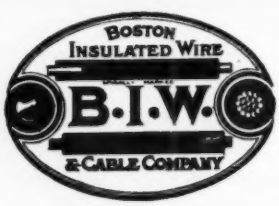

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J. C. BURLEY, '27

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THE INSTITUTE GAZETTE

(*Concluded from page 182*)

Committee has participated in the past have been brought to a successful fulfillment. Other plans in which it has been much interested are in the process of being carried out. Much remains to be done, but the staff is working with a fine spirit to build this Department into one that is truly worthy of the Institute's position of leadership in engineering education and research.

The importance of an outstanding Department of Civil and Sanitary Engineering at the Institute has long been recognized, but it should be emphasized that the need for achievement in this field is especially significant today. One has only to point out the presence of problems such as those of traffic congestion, stream pollution, and the susceptibility of structures of all kinds and of congested areas to atomic-bomb damage, to mention only a few, to recognize the social and economic significance of the fields covered by this Department. One has only to consider the immense backlog of construction needs – new power developments, new buildings of all types, and new highways, both in this country and abroad, – to appreciate the opportunities that lie ahead for the young men who will be trained by this Department.

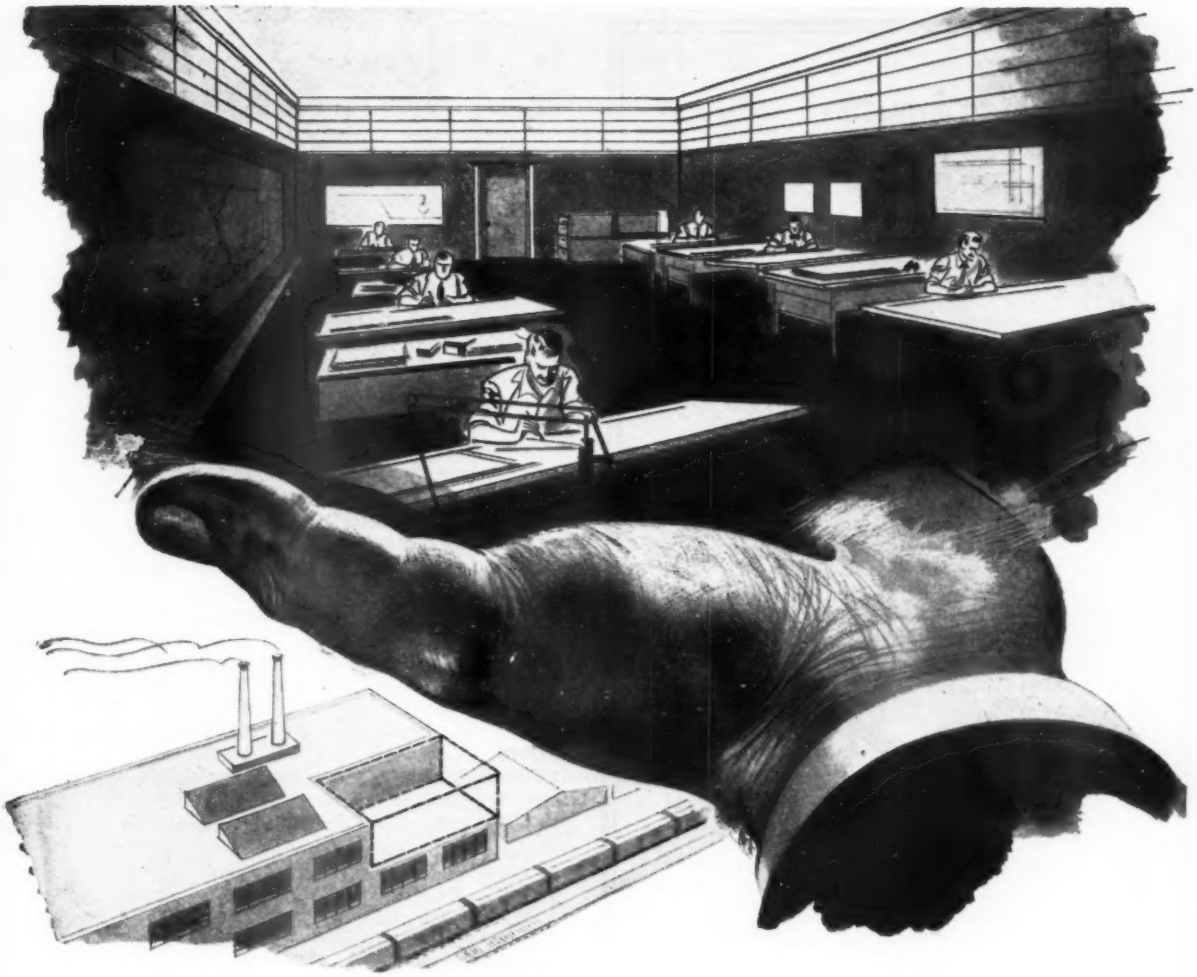
The enrollment of students in the Department of Civil and Sanitary Engineering comprises at the present time approximately four per cent of the entire Institute enrollment. In the opinion of the Committee, the importance of the contribution of civil and sanitary engineers to the social and economic structure of our civilization is such that a larger percentage of students should be enrolled by this Department. This thought underlies the various recommendations made by the Committee in this report.

FIFTY YEARS BEFORE THE MASTHEAD

(*Concluded from page 160*)

face of governmental restrictions on poundages allowable, thinner paper and narrower margins became the order of the day. Besides, during World War II, the ideas of printers as to production costs magnified, and some of the "finer things" typographical could no longer be at the editor's beck and call. In the face of these handicaps, however, the eighth editor could point with pride to the fact that that which he edited was well edited, and that his readers rightfully appreciated his achievement.

So much for Messrs. Killian and Fassett, and now for Mr. Dudley, the present editor. But, as for Mr. Dudley . . . since anniversary numbers of The Review are scheduled rigidly to appear but once each quarter century, retrospective appraisal of how he warmed the editorial chair necessarily rests with some other publisher than me . . . unless, by 1974, Mr. Dudley has not joined me tending fires in limbo, and instead succumbs to perpetrating his own apologia.



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GRAVEL

(*Continued from page 161*)

One time when the dust-streaked truck
Racketed back into the pit,
No more loose-piled easy shoveling waited,
And one ran catlike up the steep wall,
Up the grey, the blue, the red blurs of rust,
And struck a pick into the compact confusion –
Dolomite, and chert, and quartz, and trap, and pegmatite,
Round, oval, broken cone, shapeless form and formless shape –
And scrambling sprang one side as the loose rock
Sifted, rattled, rushed, rolled, roared
In a smoking stony cataract down.

"Look here, look here!" (I heard the learned and jovial mathematician.)
"It is only a matter, a simple matter of statistical mechanics,
This matter of turbulent flow. Given, a boundary layer
And random distribution of particles in disorderly motion,
As bees in a box – "
So turbulent matter and flowing chaos out of old years
May be ticketed, and the mind with old words
Fix order on each stone and his brother.
And the mercurial economist spoke too through the dirty dust,
Proclaiming stability an illusion, as indeed the rock seemed to demonstrate
In every sector of the immediate economy
(Not to mention the anatomy),
Proclaiming the eternal dichotomies –
Labor vis-a-vis value,
Value vis-a-vis price,
Capital, increment, boom, crash,
Intimate ambivalence,
And ultimate turbulence,
And no order ever imposable by word or by stone
On man and his brother.

And I spoke with dust-dry lips.
I said, "Eli and Norbert, listen,"
I said, "here is a road to be built,
And a glacier has done the most of the work,
Bringing here in convenient confusion
Tons upon tons of beautiful gravel,
Here in this hollow hill,
Here in the town pit, from which each taxpayer
At his own charges may haul
For his road good gravel.
Now is not this a turbulent thing,
A thing disturbing and unstable,
Ten billion billion tons of thunderous frost
Moving and bellowing through aeons,
Bringing the beautiful gravel to lie here in the hollow hill
Awaiting its lot in roads to be built?
It lies as you talk, and so may we all of us, sometime,
No value it has, wanting labor.
Loaded, hauled, and placed, it is good for something,
Its turbulent chaotic disarray becomes effectual order,
And roads are things of value," I said.

(*Concluded on page 188*)

GEORGE W. DUNN -- PHILADELPHIA, PA.

This story should be of interest to every college man H.C.C.

How did I make the transition from a Teachers' College to the life insurance business? Here is about how it happened.

I waved a fond farewell to Moorhead State Teachers' College, Minnesota, in the spring of 1941, and settled down to do some serious thinking concerning my future. Uncle Sam supplied some of the answers in September of that year, and for the next five years the Army Air Corps was my boss, and my address was a succession of Army Air Bases and A.P.O. numbers, which stretched from Colorado to Scotland, England, Africa, Italy and Corsica.

For two of these years it was my good fortune to be associated with a brother officer, "Cap" Haines, in civilian life a partner in New England Mutual's Philadelphia General Agency, Moore and Haines. He, my wife--a U. S. Army nurse, whom I married in Africa--and I spent long hours discussing life insurance and its possibilities as a career for me. It offered all of the things that I had ever hoped for in business: independence, unlimited income possibilities and, most of all, a never-ending challenge to my ability in a field where limits do not exist, excepting as I alone set them.

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George W. Dunn

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Facts such as these helped George Dunn solve his career problem. If you'd like to know more, write Mr. H. C. Chaney, Director of Agencies, New England Mutual Life Insurance Company, 501 Boylston Street, Boston 17, Massachusetts.

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Blaylock Atherton, '24, Nashua
Leland S. Person, '34, Rutland

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A Report
TO M.I.T. MEN

In 1917 Walker Memorial Building was opened, a gift from Alumni for the welfare of M.I.T. students. In addition to including offices for student activities and serving as a student social center, this building houses the dining service.

In 1947-48 nearly one million meals were served to staff and students. Morss Hall seats approximately 500 people. Thus, each chair served 2,000 people per year or 5.5 persons per day. We thank the Alumni for making these services possible.

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GRAVEL

(Concluded from page 186)

And we hauled away, and up out of the pit,
With night hanging over the meadow.
Serene we were, as who would not be:
Glaciers, and thousands of miles of thousands of tons transported,
But only the labor and the last ten miles gave order and value.
Over the road we rolled slow and stately,
With a pause at the spring by the maple orchard,
And talk was of Arthur Keene and Harold Bean,
The bobcat heard and the buck deer seen
At the old old crossing on the ridge
Where a star was bright in the brighter sky.

THE TREND OF AFFAIRS

(Concluded from page 154)

The Review during the period in which each editor was responsible for the publication.

Two decades ago, The Review was beginning to establish a format and method of treatment not widely different from that used today. In January, 1929, The Review boasted of an editor (H. E. Lobdell, '17), a managing editor (James R. Killian, Jr., '26), an assistant managing editor (John D. Crawford, '27), a contributing editor (John J. Rowlands), and a circulation manager (Ralph T. Jope, '28). But the lush plethora of engineering trained writing talent has disappeared and, for some time now, the editor has been his own managing editor and assistant managing editor. As for copy, the January, 1929, issue contained an article "Honors Study in Engineering" by Richard H. Frazier, '23, "Telescopes in the Making" by James R. Killian, Jr., '26, in addition to "Evolution Everywhere" by Professor Emeritus Hervey W. Shimer.

The January, 1939, issue of The Review was the last under the editorship of James R. Killian, Jr., who as President Compton's administrative assistant succeeded Vannevar Bush, '16. The Institute's Department of English and History supplied a new editor when Professor Frederick G. Fassett, Jr. left the classroom to wield the blue pencil, beginning with the February, 1939, issue.

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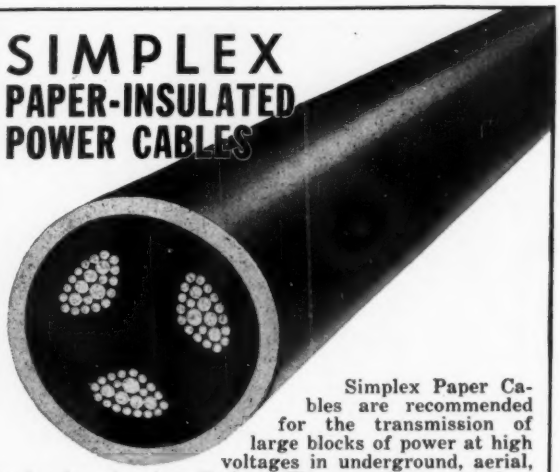

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HOW M. I. T. APPEARS TO AN OUTSIDER ON THE INSIDE

(*Continued from page 168*)

Thus, I would say that M.I.T. is unique because:

1. There is a definite limitation of what we attempt to do, which puts us in a class with the wealthiest institutions in the world, though we are some distance from the top in actual endowment. Who would suggest that M.I.T. trade 10 of the best engineering and five of the best science departments in the world for third-rate departments in these fields, plus a second-rate law school, school of education, and dental college?

2. The undergraduate body is preselected for professional interest and promise because of the very nature of the school; it is then further selected by a rigorous admissions system, and those admitted are worked much harder than is customary in most colleges. It is difficult to appreciate the real differences between institutions which exist in this regard without actually passing through them oneself.

3. There is a co-operative spirit among the departments and faculties of the Institute which arises partly from the limitation of endeavor to engineering, scientific, and associated fields; partly from the sharing of lecture halls and the integration of buildings; and partly from the unity of direction of the Institute from an administrative standpoint.

Considerations of this sort lead one to believe that prime desiderata for continued growth in excellence of the Institute are: avoidance of over-expansion; the finding of the proper emphasis of applied science between fundamental science and engineering; the maintenance of unexcelled standards of teaching and research; and far from least, "rendering," to use a familiar architectural term.

I once wrote a paper about a vacuum spectrograph, and hunted around for a student who could draw suitable illustrations for scientific publication. The Section of Graphics had no one to recommend at the time, so I got a boy from the School of Architecture. After he had completed some very nice drawings, he asked me if he shouldn't "render" them. When I didn't understand, he explained that this meant putting trees and shrubbery around the instruments, to make them look nice. Dean Baker has emphasized how much this sort of thing is needed around the Institute, and you have all had a chance to see the beginning steps that have been taken toward "rendering" our surroundings more habitable.

A scientist always tries to look at all possible alternatives. Suppose we cannot raise $20,000,000 for the Institute; what shall we do then? One possibility would be to sell the Institute; I feel sure that the University of Massachusetts would pay $10,000,000 for the plant. This, added to Horace Ford's endowment figures, would give us about $50,000,000 to distribute among the Alumni, or roughly $1,500 per Alumnus. Possibly, Mr. Dalton, who heads our Financing Development Program, might like to write every graduate of M.I.T.

(*Concluded on page 192*)

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HOW M. I. T. APPEARS TO AN OUTSIDER ON THE INSIDE

(Concluded from page 190)

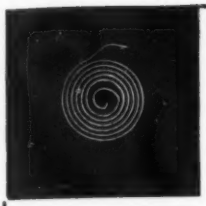
and ask whether he would rather receive $1,500 for his equity in M.I.T., and have the old school go out of existence, or do his part in raising his average of $500 so that M.I.T. may rise to still greater heights of leadership and service. I am so sure of the reply, and so moved by Mr. Ford's recital of the fiscal rise and maturity of M.I.T., that I would almost be willing to guarantee a refund of $1,500 out of my own pocket to any Alumnus who is dissatisfied with the results of our use of his contribution. For reasons which I need not go into, this offer is limited to a total of 1.2 Alumni.

Sitting in the audience yesterday, hearing my various colleagues describing the needs of M.I.T., each with his special interests, but all so well integrated and mutually interdependent, I wondered, "How could any man be anything but proud to belong to such a team?" And when I looked out into the audience and saw all of you, who have come so many miles, I wondered how any group could fail to be inspired at this evidence of devotion to an institution and to a cause.

I don't know a good scientific way to calibrate devotion and interest, but from my own experience on airplanes and trains, I would think that the number of man-miles might be a fairly reliable index. In fact, taking a leaf from the advertising manager for Camel cigarettes, we seem safe in taking the number of miles a man is willing to travel for M.I.T. as at least indicative. I don't know how many such miles were totaled up by the group in this room, but I do know that before the Chicago contingent gets home again more than 30,000 man-miles will have been totted up. I know your willingness to do this is an indication of your pride in the performance and traditions of M.I.T., your confidence in its future mission, and your determination to insure the realization of this mission.

And now I should like to address a few words to the chairman of the Committee on Financing Development. Marshall Dalton, I envy you. You have heeded the call of your Alma Mater and have risen to her assistance at a time which may be the most crucial in the first century of her history — whether she can rise to still greater heights in American and world education, or will be forced to level off and inevitably to find equilibrium at a lower level. I envy you because I know you are going to be successful; you are going to be successful because you will have solidly behind you the great body of M.I.T. Alumni, who will not allow this effort to fail. M.I.T. builds something into a man; that is the difference between living and nonliving material. Living material has the property of transforming nonliving material into such form that it can be endowed with life, and one could ask for no more striking presentation of this phenomenon than the one we have seen in the last day and a half.

I cannot claim the great distinction of putting those little numerals after my name, but I can say that I am proud, as you are proud, to be associated with M.I.T.



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FUNDING M. I. T.'S INDEPENDENCE

(*Concluded from page 164*)

I think it was G. K. Chesterton who once remarked of a reformer who was also an optimist that he felt the world to be so good that it must be made better. I would apply this paradox to my own feeling about M.I.T. Because we are strong, we must be still stronger. We cannot stand still. No institution, particularly no educational institution, can be static and remain strong. Francis Bacon long ago generalized this principle. "That which man altereth not for the better," he observed, "Time, the great Innovator, altereth for the worse." If we are to keep this institution strong, we must constantly adjust its program to new needs and new conditions; we must constantly be seeking to make it a better institution.

These are some of the basic considerations which underlie our Development Program. I believe that they warrant and command the assistance of all who value and love this institution. I believe that the successful prosecution of our Development Program will not only result in the continuing vitality of M.I.T. but that it will be a beacon light of encouragement to all privately endowed institutions, the bulwarks of our educational system.

It was William Barton Rogers, our founder, who stated the case better in 1863 than it has ever been stated since, when he wrote: "I am sure that I speak from no impulse of mere enthusiasm when I say that this new undertaking presents an opportunity of practical beneficence in connection with education which is not only peculiar but without precedent in this country. My experience as a teacher and my reflections on the needs and means of industrial instruction assure me that this enterprise, when truly understood, *must* command the liberal sympathy of those who aim to make their generosity fruitful in substantial and enduring public good."

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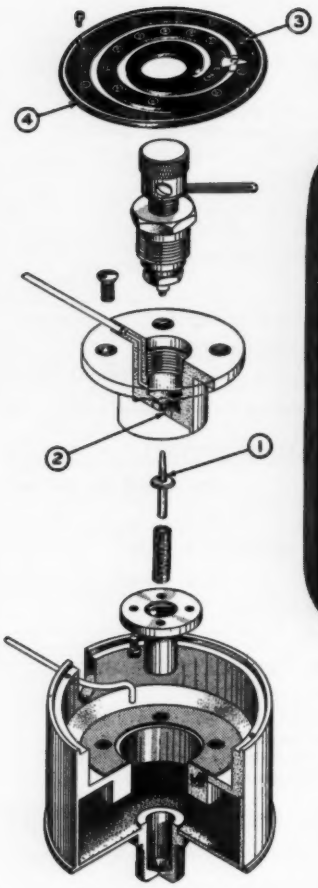

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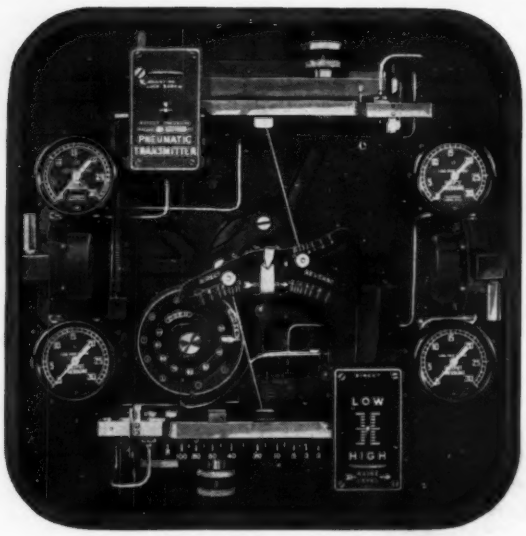
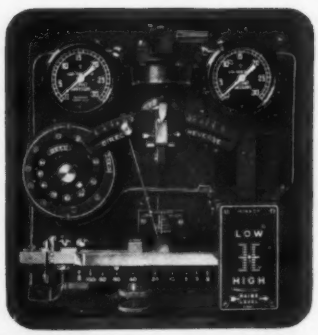


Model 12610-20 Proportional-Reset Controller and Pneumatic Transmitter



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